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National Research Council Canada

2012-13

Departmental Performance Report

The Honourable James Moore
Minister of Industry

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Minister's Message

I am pleased to report on the Industry Portfolio's key activities for 2012–13.

During this period, the Portfolio continued to develop and recruit leading research talent through programs administered by the federal granting councils. It also took significant steps to improve commercialization outcomes through the transformation of the National Research Council into an industry-focused research and technology organization. This was complemented by reinvestments in programs such as the College and Community Innovation Program and the Centres of Excellence for Commercialization and Research.

In 2012–13, our government supported Canadian businesses of all sizes through Economic Action Plan 2012. Support for the National Research Council of Canada's (NRC) ongoing transformation was an integral part of this plan. With its renewed focus and commitment to helping Canadian industry remain on a productive, profitable and sustainable growth path, NRC's transformation will support enhanced productivity, high-quality jobs and research and development. These support mechanisms are essential for Canada to compete in the global economy and will contribute to jobs and economic growth.

Moving forward, the Industry Portfolio will continue to exercise fiscal responsibility while delivering on government priorities to support jobs and economic growth. Portfolio agencies will continue to play key roles in encouraging collaboration between the research community and the private sector; strengthening the manufacturing sector to sustain and attract globally competitive industries; and bringing forward the government's response to the Review of Aerospace and Space Programs and Policies to maintain Canada's leadership position in those areas.

It is my pleasure to present the 2012–13 Departmental Performance Report for the National Research Council of Canada.

James Moore
Minister of Industry

Minister of State's Message

Over the reporting period, the Industry Portfolio took significant actions to foster even further growth of an innovation culture in Canada. Strategic measures were taken in basic and applied research across sectors in alignment with our government's commitment to an efficient and competitive marketplace, a healthy and innovative knowledge-based economy, and a competitive and sustainable business community. These measures are capable of driving increased wealth in the Canadian economy.

To achieve our goal of getting more ideas from labs to the marketplace, we leveraged past investments, developed and recruited to Canada world-leading research talent, and encouraged greater participation and support of the private sector in research, development and innovation. Included in these efforts were strategic initiatives to improve commercialization outcomes through the refocused National Research Council of Canada (NRC), a pilot program to help small and medium-sized enterprises access research and business development services, investments to support the development of clean technologies, and funding to support partnerships between post-secondary institutions and industry. These efforts will help encourage even more growth and build our country's wealth of knowledge.

In 2012–13, NRC entered the final phases of its transformation into Canada's national research and technology organization. This refocusing will strategically position NRC to provide the market-driven research, technology development and commercialization support services that Canadian companies can harness to thrive in today's globally competitive, innovation-based economy. It will also help build the foundations for a more prosperous future with the cutting-edge technology of tomorrow.

In the year ahead, our government will continue to bridge the divide between the research and business communities, with a view to strengthening industrial performance for the benefit of the country. During a period of difficult economic pressures, the efficient use of resources is more significant than ever. The Portfolio will focus on innovation to create jobs, promote growth and ensure long-term prosperity and a better quality of life for

Canadians, and these will remain the priorities of our government as we position Canada for the future.

Greg Rickford
Minister of State (Science and Technology) (Federal Economic Development Initiative for Northern Ontario)

President's Message

I am pleased to submit for tabling in Parliament, the 2012-13 Departmental Performance Report for the National Research Council of Canada. During these times of global economic upheaval and uncertainty, Canada needs a strong national research and technology organization focused on supporting private sector innovation. This past year saw NRC implement the final phases of our strategic re-focusing efforts to transform into Canada's research and technology organization. In this new role, we have committed to an unwavering focus on investing in mission-oriented research and development (R&D) to support industrial productivity and competitiveness in Canada.

Mr. John McDougall, President

For the last three years, we have been hard at work rebuilding our organization from the ground up, confirming our new business model, mission, vision and set of values to guide us, and restructuring our existing activities into industry demand-driven programs.

In March 2013, Budget 2013 confirmed $121 million over two years to support this innovation-driven transformational agenda, allowing us to launch our robust roster of demand-driven programs to Canadian clients in the 2013-14 fiscal year. To further bolster our refined focus on supporting the innovation needs of Canadian industry, the Federal budget also committed $20 million to establish a new "research credit note" pilot program, delivered through the National Research Council's Industrial Research Assistance Program. This new initiative will enable hundreds of small and medium-sized enterprises to commercialize their products and move them to market more quickly and effectively.

A refocused NRC will support Canada in becoming one of the world's most vibrant 21st century economies – one that achieves economic growth and development through sustainable and responsible stewardship of our environment; one that is poised to address global resource, infrastructure and environmental challenges; and one that generates knowledge-intensive jobs, values ingenuity and offers the promise of a prosperous future for generations of Canadians to come.

Section I: Organizational Overview

Raison d'être

The National Research Council Canada (NRC) bridges the innovation gap between early stage research and development (R&D) and commercialization, focusing on socio-economic benefits for Canadians and increasing national performance in innovation. As Canada's national research and technology organization (RTO), NRC supports the business sector in Canada to enhance innovation capabilities and capacity and become more productive in the development and deployment of innovative products, processes and services for targeted markets. With a presence in every province, NRC combines a strong national foundation with international linkages to help Canada grow in productivity and remain globally competitive. To ensure a multi-disciplinary and integrated approach, NRC works in collaboration with industry, governments, and academia.

NRC VISION

To be the most effective research and technology organization in the world, stimulating sustainable domestic prosperity.

NRC MISSION

Working with clients and partners, we provide innovation support, strategic research, scientific and technical services to develop and deploy solutions to meet Canada's current and future industrial and societal needs.

Responsibilities

Under the [i] National Research Council Act, NRC is responsible for:

- Undertaking, assisting or promoting scientific and industrial research in fields of importance to Canada;
- Providing vital scientific and technological services to the research and industrial communities;
- Investigating standards and methods of measurement;
- Working on the standardization and certification of scientific and technical apparatus and instruments and materials used or usable by Canadian industry;
- Operating and administering any astronomical observatories established or maintained by the Government of Canada;
- Establishing, operating and maintaining a national science library; and
- Publishing and selling or otherwise distributing such scientific and technical information as the Council deems necessary.

NRC Accountability Framework

NRC is a departmental corporation of the Government of Canada, reporting to Parliament through the Minister of Industry. NRC works in partnership with members of the Industry Portfolio to leverage complementary resources to promote the innovation of firms, to exploit synergies in key areas of S&T, to promote the growth of small and medium-sized firms (SMEs) and to contribute to Canadian economic growth. NRC's Council provides

independent strategic direction and advice to the NRC President and reviews organizational performance. The President provides leadership and strategic management and is responsible for the achievement of NRC's long-range goals and plans within the guidance of the NRC Council. Each of NRC's seven Vice Presidents is responsible for a number of areas composed of research programs, initiatives, centres and/or a corporate branch. Vice Presidents and NRC managers are responsible for executing plans and priorities to ensure successful achievement of objectives.

Strategic Outcomes and Program Alignment Architecture (PAA)

To fulfill its mandate, NRC's programs are aligned to achieve two Strategic Outcomes (SOs):

SO1. Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology.
SO2. Canadians have access to research and development information and infrastructure.

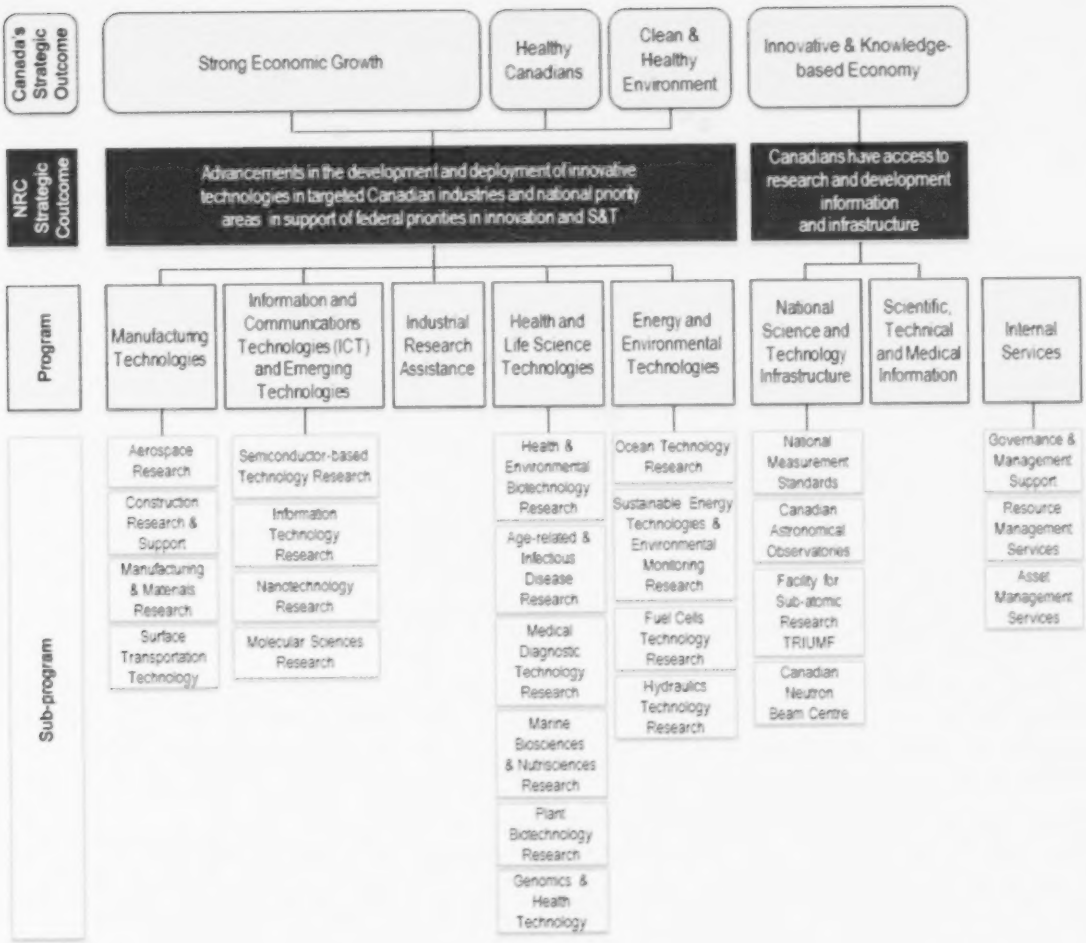
NRC's approach is directly aligned to the [ii] Government of Canada's science and technology (S&T) strategy, *Mobilizing Science and Technology to Canada's Advantage* and the four federal S&T priority areas: Information and communications technologies, environmental science and technologies, natural resources and energy, and health and related life sciences and technologies. NRC actively contributes to these priority areas by supporting research and providing innovation support related to a variety of key areas, including natural resource value chains, climate change and the environment, health care cost pressures, complex security challenges, communities, and economic growth and industrial sustainability.

NRC's Programs [1] directly support the delivery of NRC's Strategic Outcomes, aligning the strengths and critical mass required to achieve four of [iii] Canada's Strategic Outcomes (SOs): strong economic growth; healthy Canadians; a clean and healthy environment; and an innovative and knowledge-based economy. The PAA structure, shown below, is NRC's currently approved PAA for reporting on the organization's activities to achieve these expected results, and is aligned with Government of Canada's Strategic Outcomes and federal priorities. As part of implementing NRC's new strategy, the NRC PAA will be updated as necessary, to ensure continued alignment and contribution towards Canada's Strategic Outcomes.

[1] The Policy on Management, Resources and Results Structures (MRRS) underwent changes to its nomenclature, effective April 1, 2012. Specifically:

- "Program Activity Architecture" becomes "Program Alignment Architecture" (PAA);
- "Program Activity" becomes "Program";
- "Sub-Activity" becomes "Sub-Program";
- "Sub-Sub-Activity" becomes "Sub-Sub-Program."

These changes are reflected in the 2012-13 DPR.


Canada's Strategic Outcome
Strong Economic Growth
Healthy Canadians
Clean & Healthy Environment
Innovative & Knowledge-based Economy
NRC Strategic Coutcome
Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and S&T
Canadians have access to research and development information and infrastructure
Program
Manufacturing Technologies
Information and Communications Technologies (ICT) and Emerging Technologies
Industrial Research Assistance
Health and Life Science Technologies
Energy and Environmental Technologies
National Science and Technology Infrastructure
Scientific, Technical and Medical Information
Internal Services
Sub-program
Aerospace Research
Construction Research & Support
Manufacturing & Materials Research
Surface Transportation Technology
Semiconductor-based Technology Research
Information Technology Research
Nanotechnology Research
Molecular Sciences Research
Health & Environmental Biotechnology Research
Age-related & Infectious Disease Research
Medical Diagnostic Technology Research
Marine Biosciences & Nutrisciences Research
Plant Biotechnology Research
Genomics & Health Technology
Ocean Technology Research
Sustainable Energy Technologies & Environmental Monitoring Research
Fuel Cells Technology Research
Hydraulics Technology Research
National Measurement Standards
Canadian Astronomical Observatories
Facility for Sub-atomic Research TRIUMF
Canadian Neutron Beam Centre
Governance & Management Support
Resource Management Services
Asset Management Services

Organizational Priorities

Priority 1	Type[2]	Strategic Outcome
Cultivate business innovation to increase the productivity of Canada's industrial sectors and to support the economic growth and development of communities across Canada.	Ongoing	SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology.
Summary of Progress		
• In 2012-13, NRC's Industrial Research Assistance Program (NRC-IRAP) provided $173.2M to 2,761 firms and 189 organizations for 3,559 innovation projects that supported 12,899 jobs, including 333 for recent graduates through the Youth Employment Strategy. Additionally, 8,412 SMEs received advisory services for innovation. Through the Digital Technology Adoption Pilot Program (DTAPP), $21.1M of funding was allocated to 414 firms, resulting in 433 innovative digital technology adoption and implementation projects and supporting 3,684 jobs. DTAPP also contributed $1M to 46 organizations and $2.1M to colleges, to provide SMEs with services and support in the form of operational productivity assessments, technology adoption readiness assessments, feasibility studies, benchmarking analyses, adoption roadmaps, expert advice on specific technologies, use of facilities, educational seminars and training support. • On September 6, 2012, NRC signed the Canadian Wheat Flagship Strategic Alliance agreement with Agriculture and AgriFood Canada, the University of Saskatchewan, and the province of Saskatchewan. These parties committed to work together, and in collaboration with others, to improve wheat yield for the benefit of Canadian farmers and Canada's economy. • A pilot project agreement was signed in December 2012, engaging a large scale carbon emitter and an algal photobioreactor producer, to begin work under the Algal Carbon Conversion Flagship. A facility will be built, to recycle industrial emissions by using carbon dioxide to grow algal biomass, which will be processed into products such as biofuels, biomaterials, and soil amendment products. • NRC supported the Canadian automotive, aerospace and construction industry sectors by conducting applied research in a collaborative manner, providing technical services, establishing research consortia and licensing new technologies. One such collaboration with the aerospace sector resulted in the first 100% biofuel-powered flight of a civil aircraft – an excellent example of the development of green technologies for the aerospace sector. • NRC's efforts to facilitate networks between government and industry resulted in several successes, including the establishment of a network of stakeholders which aim to develop experimental reference materials to improve measurement technology and documentary standards for the Canadian nanotechnology industry, and ensuring that NRC's Vaccine Program addressed major stumbling blocks in bringing Canadian vaccine candidates to clinical development.		

Priority 2	Type	Strategic Outcome
Enhance the generation and commercialization of knowledge in Canada by providing integrated scientific support and infrastructure.	Ongoing	SO2: Canadians have access to research and development information and infrastructure.
Summary of Progress		
• NRC provided Canadian firms and researchers with access to facilities, programs and other services, allowing them to conduct leading edge research and enable the commercialization of technology. This infrastructure includes the TRIUMF sub-atomic research facility, and, as mandated by the *National Research Council Act*, a national science library and astronomical observatories in which Canada has an interest.		

[2] Type is defined as: **Previously committed to** – committed to in the first or second fiscal year before the subject year of the report; **Ongoing** – committed to at least three fiscal years before the subject year of the report; and **New** – newly committed to in the reporting year of the Reports on Plans and Priorities or the Departmental Performance Report.

- NRC served as Canada's national metrology institute, providing measurement standards that underlie domestic and international trade. In 2012-13, these services and expertise were accessed by over 700 clients from industry and government.
- NRC's Scientific, Technical and Medical (STM) Information Program supported the Canadian innovation community by providing access to the national science library collection of international publications. NRC also contributed to the efficient provision of information needed by federal programs across government through its shared library technical services to nine other government departments and agencies.

Priority 3	Type	Strategic Outcomes
Strengthen the NRC business management model to deliver on expected results.	Ongoing	SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology, and SO2: Canadians have access to research and development information and infrastructure.

Summary of Progress

- NRC is completing the transition to a program-based management model and implementing a rigorous stage-gated process to design and approve programs that meet the needs identified by industry. This includes assessing programs based on their multi-disciplinary nature, market-driven demand, alignment with federal S&T priorities, strong value propositions, unique positioning in the value chain, and timely deployment paths with targeted client and collaborator outcomes.
- NRC built valuable relationships under Canada's S&T Agreements with other countries, contributing to the fulfillment of Canadian priorities with targeted international economies. Of particular note, in June 2012, Canada became an associate member country of EUREKA, the largest industrial R&D network of its kind in the world (see International Relations) with NRC taking on a role as the National Office for EUREKA, and providing NRC-IRAP funding to eligible SMEs in eligible EUREKA projects. In addition, a collaborative research agreement was signed with CEA (the French commission for alternative and atomic energy) to explore the potential for commercially cultivated microalgae.
- NRC's business management group was restructured in 2012-13 to reflect the changing needs of NRC. New positions were created for more focused engagement and emphasis on client interactions, strategic business guidance, technical business analysis, and contract management organization-wide.

Priority 4	Type	Strategic Outcomes
Ensure effective and efficient resource management for a sustainable organization.	Ongoing	SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology, and SO2: Canadians have access to research and development information and infrastructure.

Summary of Progress

- In 2012-13, NRC focused on a number of human resource priorities, including development of new hiring approaches and completion of the renewal of NRC's hiring policy; continued evolution of NRC's performance management program; implementation of a new coaching services model; development of a corporate succession framework; and continued development of leadership capability across the organization.
- To strengthen decision-making and operational efficiencies and to establish long-term measures for sustainability, NRC implemented significant changes to financial management processes and systems and introduced standard reporting tools.
- NRC continued to transfer IT services to Shared Services Canada (SSC) while improving efficiencies through IT consolidation and centralization. During this process, it maintained service levels while achieving an uptime of 98% for critical IT infrastructure and services. NRC also implemented a lifecycle and bulk-buying plan for desktop and laptop computers, realizing savings of $400K (22%) in 2012-13.

Risk Analysis

In 2012-13, Canada continued to achieve sustained growth despite the global economic crisis. The latest release of the [iv] Science, Technology and Innovation Council 2012 report, however, raised concerns related to the continuing decline in the nation's gross domestic expenditures in R&D, particularly driven by declines in private sector R&D funding. Canada ranks only in the middle amongst 41 OECD economies for business innovation, identified as a key engine for productivity growth, increased competitiveness and higher living standards.

The Government of Canada has recognized this challenge and placed a clear priority to support innovation that focuses resources on business-led, industry-relevant research. Towards this end, NRC received $67M in the 2012 federal budget as part of the Economic Action Plan to support its realignment towards industry-oriented services, as well as $110M/year to double its Industrial Research Assistance Program. As these funds were operationalized, NRC continued its re-focusing while also seeking further ways to enhance efficiency of service delivery.

NRC's Report on Plans and Priorities (RPP) for 2012-13 referenced corporate risks under three themes: Transition, Engagement and Communications, and Operations. These internal risks were important to manage during NRC's significant change in the fiscal year:

Transition: Given that 2012-13 was a transition year for NRC, several risks identified in the Corporate Risk Profile (CRP) were internally oriented. Changes took place in the year in structures and processes related to several areas of program and corporate activity, including the launch and implementation of a new financial model (moving from cash to accrual accounting), a new business management support function, a new foresight function – as well as continued improvements on project and program management, and corporate planning and quarterly performance reporting. A Transformation Coordinator position was established to develop NRC's transformation road map and effectively manage NRC's changes, including changes to NRC common services.

Engagement and Communications: NRC's Communications function was centralized in 2012-13 to allow more consistency and cohesiveness around internal and external communications with the public, government and other stakeholders. A Communications Committee was created to guide corporate communications-related practices. To sustain internal staff engagement, regular web-based "e-polls" were launched to gauge staff views on issues, concerns and satisfaction, in addition to quarterly newsletters to keep employees informed of NRC changes. NRC's new Commitment to Excellence (CTE) program continued to be implemented to align staff performance commitments with organizational and business priorities and encourage ongoing conversations throughout the year between supervisors and staff on performance.

Operations: To ensure that operations were sustained and that NRC's transition was on track, NRC's senior executive committee engaged in quarterly progress reviews against commitments, including review of key performance indicators and corporate risks. Efforts

were also made to align individual staff commitments with corporate priorities. Meetings and townhall sessions also took place throughout the year between NRC managers and its senior executive committee to discuss NRC's re-focusing efforts and strategic direction. Training and advisory support continued to be delivered around NRC's new processes. For greater focus on risk monitoring and management, monthly reporting on physical and IT security was enhanced to include additional details around personnel and contract security, and training delivered around IT Security, and Controlled Goods. An NRC-wide risk assessment of physical security for all facilities was also launched in 2012-13 and will continue into 2013-14.

To respond to the new reporting requirements for the DPR, specific externally-oriented high risks and responses identified in the CRP include the following:

Risk	Risk Response Strategy	Link to Program Alignment Architecture	Link to Organizational Priorities
Security: Risk of compromised security (physical, information and/or information technology).	• Consider security issues up front in designing programs and partnerships (e.g., management/protection of proprietary information generated from program; how information and facilities/systems will be shared with various partners); identify threats and vulnerabilities. ***Progress:*** *Work is ongoing to strengthen risk management principles in program management, and an Emergency Preparedness Working Group is in place to prepare the Strategic Emergency Management Plan (SEMP), and the SEMP implementation plan. Other progress is described above under "Operations".*	• SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology • SO2: Canadians have access to research and development information and infrastructure	**Priority 4:** Ensure effective and efficient resource management for a sustainable organization.
Organizational Agility: Risk that NRC's level of organizational agility may reduce its ability to respond in a timely manner to client needs, and/or business opportunities.	• Maintain Level 2 Organizational Project Management Capacity Rating[1]. • Maintain effective communications with clients/stakeholders as NRC refocusing and programs continue to roll out. ***Progress:*** *NRC has been successful in maintaining its Level 2 rating, pending Treasury Board approval, affording it a more streamlined management process. Other progress is described under "Engagement and Communications" above.*	• SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology • SO2: Canadians have access to research and development information and infrastructure	**Priority 1:** Cultivate business innovation to increase the productivity of Canada's industrial sectors and to support the economic growth and development of communities across Canada.
Client Relationship Management (CRM): Risk of ineffectively working with clients and not	• Ensure clear client engagement strategy and communications are in place to help manage the uncertainties during transition period. • Pursue progress in implementing the new CRM system (including associated training and support for culture change).	• SO1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation	**Priority 3:** Strengthen NRC business management model to deliver on expected results.

strategically managing client relationships.	***Progress:*** *A new CRM system was established to support the effective provision of business management support to NRC. This included implementation of key account managers, business portfolio advisors, and a new contract management process including opportunity management. See other progress above on "Engagement and Communications".*	and Science and technology • SO2: Canadians have access to research and development information and infrastructure	

[1] The [illegible] Organizational Project Management Capacity Assessment is a self-assessment tool for departments to aid the Treasury Board Secretariat in determining their class of project management capacity for the purposes of project approval and expenditure authority.

Summary of Performance

Financial Resources – Total Departmental ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference (Planned vs. Actual Spending)
700.5	700.5	960.1	804.8	104.3

Human Resources (Full Time Equivalents (FTEs))

Planned 2012-13	Actual 2012-13	Difference 2012-13
3688	3739	51

Note: Differences in planned and actual spending and FTEs include changes announced in Budget 2012.

Performance Summary Table for Strategic Outcomes and Programs ($ millions)

Strategic Outcome 1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology

Program	Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending			Total Authorities (available for use) 2012-13	Actual Spending (authorities used)			Alignment to Government of Canada Outcomes
		2012-13	2013-14	2014-15		2012-13[1]	2011-12	2010-11	
Manufacturing Technologies	120.7	120.7	112.1	125.8	170.7	99.2	111.8	128.6	Strong Economic Growth
Information and Communications Technologies and Emerging Technologies	44.8	44.8	50.3	54.4	78.0	52.7	69.1	77.2	Strong Economic Growth
Industrial Research Assistance	162.6	162.6	279.9	240.7	259.9	244.6	146.3	286.2	Strong Economic Growth
Health and Life Science	107.5	107.5	73.3	69.7	134.6	82.5	102.9	115.1	Healthy Canadians

Technologies									
Energy and Environmental Technologies	**27.9**	**27.9**	**33.5**	**38.3**	**43.7**	**27.5**	**30.0**	**36.5**	**A Clean and Healthy Environment**
Strategic Outcome 1 Sub-Total	**463.5**	**463.5**	**549.1**	**528.9**	**686.9**	**506.5**	**460.1**	**643.6[2]**	

[1] In order to align with departmental authorities by Program, as presented in Vol. II of the Public Accounts, services provided without charge amounts for employer's contribution to employee insurance plans, such as the Public Service Health Care Plan and the Public Service Dental Plan provided by the Treasury Board of Canada Secretariat, accommodations provided by Public Works and Government Services Canada, Workers' compensation provided by Human Resources and Skills Development Canada and legal services provided by the Department of Justice are not to be included in this figure. This information is presented in Departmental Financial Statements.

[2] Increased spending in 2010-11 is attributable to increased temporary spending levels under Canada's Economic Action Plan

Strategic Outcome 2: Canadians have access to research and development information and infrastructure

Program	Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending			Total Authorities (available for use) 2012-13	Actual Spending (authorities used)			Alignment to Government of Canada Outcomes
		2012-13	2013-14	2014-15		2012-13	2011-12	2010-11	
National Science and Technology Infrastructure	98.9	98.9	94.3	98.2	105.6	94.9	96.4	98.6	**An Innovative and Knowledge-based Economy**
Scientific, Technical and Medical Information	18.7	18.7	14.7	14.7	19.8	16.5	18.1	33.6	**An Innovative and Knowledge-based Economy**
Strategic Outcome 2 Sub-Total	**117.6**	**117.6**	**109.0**	**112.9**	**125.4**	**111.4**	**114.5**	**132.2[1]**	

[1] Increased spending in 2010-11 is attributable to increased temporary spending levels under Canada's Economic Action Plan

Performance Summary Table for Internal Services ($ millions)

Internal Services	Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending			Total Authorities (available for use) 2012-13	Actual Spending (authorities used)		
		2012-13	2013-14	2014-15		2012-13	2011-12	2010-11
	119.4	119.4	162.0	171.0	147.8	186.9	123.9	127.6
Sub-Total	119.4	119.4	162.0	171.0	147.8	186.9	123.9	127.6

Total Performance Summary Table ($ millions)

Strategic Outcomes and Internal Services	Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending			Total Authorities (available for use) 2012-13	Actual Spending (authorities used)		
		2012-13	2013-14	2014-15		2012-13	2011-12	2010-11
Total	700.5	700.5	820.0	812.8	960.1	804.8	698.5	903.3[1]

[1] Increased spending in 2010-11 is attributable to increased temporary spending levels under Canada's Economic Action Plan

The Planned Spending of $700.5M represents the best estimate at the time the 2012-13 [vi] Main Estimates were prepared, which was prior to the budget and the start of the fiscal year[3].

Total Authorities vs Planned Spending (Total Difference $259.6M)
The Total Authorities for 2012-13 include the Planned Spending and all items subsequently approved and reflect authorities available at the end of the fiscal year. The variance of $259.6M between Planned Spending and Total Authorities is mainly due to increases received from in-year adjustments from the 2012-13 [vii] Supplementary Estimates, statutory revenue carry forward balance not being reflected in the Planned Spending, and in-year increases in statutory authorities.

Voted Authorities (Difference of $186.7M): Significant funding from [viii] Budget 2012 received through the 2012-13 Supplementary Estimates included $91.4M ($110.0M announced in Budget 2012) to double support for companies through NRC-IRAP and $61.1M ($67.0M announced in Budget 2012) to [ix] refocus the NRC on research that helps Canadian businesses develop innovative products and services. Other increases to voted authorities received from Treasury Board Secretariat included eligible paylist expenditures of $14.6M, collective agreements of $12.3M, a capital carry forward authority of $6.9M, and other items of $0.4M.

Statutory Authorities (Difference of $72.9M): Statutory authorities increased by: $56.0M for statutory revenue; $16.3M for employee benefit plans (EBP); and $0.6M for other items.

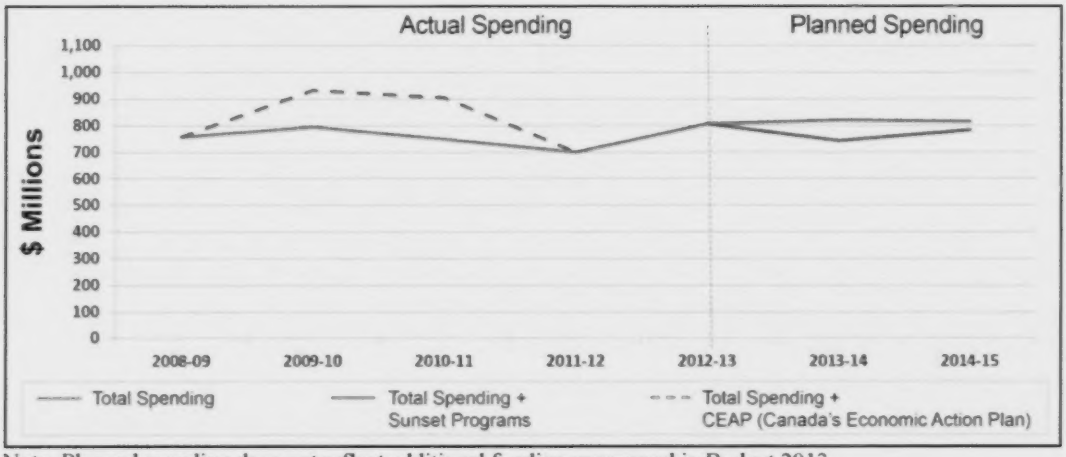
Planned vs Actual Spending (Difference $104.3M)
The variance of $104.3M between Planned Spending and Actual Spending is attributable to these more significant items: $83.7M increase in NRC-IRAP contributions directly related to the new funding to double support for companies (Budget 2012); $61.1M increase in operating mainly due to the additional funding for Refocusing the NRC from Budget 2012; $16.3M increase for statutory EBP; $14.6M increase in TB-funded paylist expenditures not included in Planned Spending, $12.3M in collective agreements; and $7.3M increase in capital spending.

Actual Spending 2012-13 vs 2011-12 (Difference $106.3M)
The increase in actual spending from 2011-12 to 2012-13 is mainly attributable to the following: increase of $85.8M in contributions for NRC-IRAP (Budget 2012); increase of $21.9M in contributions for the Digital Technologies Adoption Pilot Program; increase of $6.9M in capital spending; and an increase of $2.6M in operating spending. These increases are offset by a drop of $5.4M in statutory revenue expenditures and a $3.0M decrease in employee benefits plan.

[3] These figures do not include $110M/year to double NRC-IRAP, and $67M allocated in Budget 2012 to refocus NRC towards industry-oriented services.

Expenditure Profile

Departmental Spending Trend



Note: Planned spending does not reflect additional funding announced in Budget 2013.

NRC's actual spending for 2012-13 is $804.8M, representing 83.8% of its total authorities. Over the past three years (2010-11 to 2012-13), actual spending has averaged $802.2M. Sunsetting funds in 2010-11 previously received for Canada's Economic Action Plan (EAP) resulted in this lower average spending compared to past years' averages. Actual spending in 2012-13 increased by $106.3M when compared to 2011-12, mainly due to the increase in Contribution as discussed under the Summary of Performance section.

The increase in Planned Spending for 2012-13 and onwards is mostly attributable to the increased funding as announced in Budget 2012. Starting in 2012-13, up to $110M per year permanent increase in contributions will be received to double support for companies through NRC-IRAP, partly offset by [ ] Planned Reductions in Departmental Spending of $1.1M in 2012-13 and $15.2M per year starting in 2013-14 (Budget 2012).

NRC has numerous initiatives and programs funded on a sunsetting basis, which include the following:

- **Refocusing the NRC**: A total of $61.1M was spent in 2012-13 from Budget 2012. The sunsetting of this funding in 2012-13 will be compensated by new funding announced in Budget 2013. Although not included in the Planned Spending of the graph above, Transforming the NRC will provide approximately $120.8M over two years (ending in 2014-15).
- **Digital Technologies Adoption Pilot Program**: NRC-IRAP spent $52.6M over the last three years ($24.2M in 2012-13) and will receive funding of $37.5M in 2013-14 for this initiative (ending in 2013-14).
- **TRIUMF**: NRC contributes $19.3M annually from its permanent funding to TRIUMF, Canada's National Laboratory for Particle and Nuclear Physics. NRC will receive an additional sunsetting $50.7M funding over the next two years (ending in 2014-15).

- **Genomics R&D Initiatives**: NRC received funding of $8.8M in 2012-13 for the Genomics R&D Initiatives and will receive an additional $8.8M in 2013-14 (ending in 2013-14).

The total funding of initiatives and programs sunsetting in 2013-14 represent a total of $48.0M. This amount is offset by an increase in statutory revenue spending of $40.0M from 2013-14 to 2014-15.

Estimates by Vote

For information on NRC's organizational Votes and/or statutory expenditures, please see the [xi] *Public Accounts of Canada 2013 (Volume II)*. An electronic version of the Public Accounts 2013 is available on the Public Works and Government Services Canada's website.

Strategic Environmental Assessment

During 2012-13, NRC considered the environmental effects of initiatives subject to the [xii] Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals. The Directive applied to two initiatives: NRC-IRAP's Digital Technology Adoption Pilot Program (DTAPP), and Adoption of Information and Communications Technologies. Through the strategic environmental assessment (SEA) process, departmental initiatives were not found to have any positive or negative environmental effects.

Section II: Analysis of Programs and Sub-Programs by Strategic Outcome

Strategic Outcome 1

Strategic Outcome 1: Advancements in the development and deployment of innovative technologies in targeted Canadian industries and national priority areas in support of federal priorities in innovation and science and technology		
Performance Indicators	**Targets**	**Actual Results**[1]
Total annual sales of NRC clients attributable to NRC S&T activities	$6.65B by March 2017	Based on 2009 estimated results, extended to 2012-13, the impact of NRC S&T activities on private sector client sales has increased by between 13% and 16% (on a compound annual basis).
Amount of BERD (Business Expenditures in R&D) conducted annually by NRC clients attributable to NRC activities in S&T	$800M by March 2017	Based on 2009 estimated results, extended to 2012-13, the impact of NRC S&T activities on total client R&D has increased to between $700M and $800M.
Total R&D Fulltime Equivalents (FTEs) employed annually by NRC clients attributable to NRC S&T activities	6,500 by March 2017	Based on 2009 estimated results, extended to 2012-13, the impact of NRC S&T activities on total client R&D employment has increased to between 3,500 and 4,500.

[1] As identified in the 2012-13 MRRS submission for NRC, the frequency of data collection is 5 years. Full results will not be available until March 2017.

In 2012-13, NRC delivered on the commitments of the federal S&T Strategy through Strategic Outcome 1 – developing and deploying technologies which targeted the needs of the Canadian innovation community. NRC also developed solutions for key industrial sectors, which met national and global market needs and enhanced the competitiveness of Canadian industry. Resources were provided to SMEs, to help them engage in research and development activities and compete more effectively in world markets – additionally enhanced by Canada's participation in the [xiii] EUREKA network. NRC also made important contributions towards solutions which benefit Canadians, by collaborating with partners from a variety of sectors, including other government departments, academia and industry. These successes not only strengthen our economy, but also support quality of life for Canadians in the priority areas of health and wellness, clean environment, and the sustainable development of Canada's natural resources.

NRC as Research Partner – The value and relevance of NRC's research and supporting activities is evidenced by partner investments in collaborative research projects. Collaborative research service revenues collected in 2012-13 totaled $25.1M for NRC, while technical services totaled $47.8M, together making up approximately 80% of $91.6M in total revenues[4].

Based on economic impact modeling for NRC, there is strong evidence indicating that NRC continued in 2012-13 to increase its impact on private sector sales, R&D expenditures and R&D employment. In a previous analysis, included as part of the NRC [xiv] *S&T Economic Impacts and Return on Investments Study (2012)* and based on data of more than

[4] Cash-based accounting.

13,500 clients over a seven year period, it was found that NRC's S&T activities and services had a statistically significant impact on client sales, R&D expenditures and the number of R&D personnel employed. This analysis included a comparable set of non-client firms to ensure that any growth that would have occurred regardless of NRC's influence was properly taken into account. With respect to Business Expenditures on R&D (BERD) in Canada, in subsequent analysis NRC was found to have had a statistically significant impact on BERD at the national level, with similar overall results to those found at the individual firm level. As the frequency of data collection is 5 years on impact findings, (as identified in the 2012-13 MRRS submission for NRC), more recent results will not be available until March 2017.

Successful generation of revenue is a strong indicator of NRC's relevancy to clients and industry, and NRC's success at generating revenue generally indicates that it is addressing the Canadian industry needs and marketing challenges.

During 2012-13, NRC restructured its operations as part of its transition to a program-based, industry-oriented research and technology organization. NRC performance results are provided at the Program level, as the organization continues organizational changes announced in Budget 2012. NRC remains committed to effective and transparent reporting principles. Future reporting aligned with a new program structure is on target for the 2013-14 Departmental Performance Report cycle.

Program 1.1: Manufacturing Technologies

Program Description: *This program develops and advances technologies for enhancing the innovation capacity and growth of Canadian manufacturing industries. This is done through multi-disciplinary collaborative research and development services in addition to specialized technical and advisory services for transferring or advancing technologies into deployed industrial solutions for the marketplace. This includes the development and testing of product and process innovations as well as the provision of coordinated access to multidisciplinary research expertise and state-of-the art facilities to ensure that industries in Canada are at the leading edge of innovation.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
120.7	120.7	170.7	99.2	(21.5)

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
987	896	(91)

Note: Differences in planned and actual expenditures and FTEs reflect the centralization of overhead resources into Internal Services, which was consolidated in 2012-13.

Program Performance Summary

Expected Result	Performance Indicator	Target	Actual Result
Manufacturing industries in Canada have coordinated access to NRC's multidisciplinary research expertise and state-of-the art facilities to ensure they are at the leading edge of innovation	Percentage of surveyed clients who report that NRC's manufacturing technologies research and facilities helped advance their innovation capacity	77% by March 2014	96% (23 of 24) of the manufacturing technologies client respondents in NRC's 2012-13 client satisfaction survey reported that the services provided by NRC had a positive impact on their organization.[1] Additionally, 75% of respondents (18 of 24) indicated that NRC's service increased their knowledge and ability to plan and execute R&D projects.[2]

[1] NRC launched its new client feedback mechanism in Q4 of 2012-13. As a result, only a small sample of Manufacturing Technologies clients (24), in addition to other sector clients, was surveyed as part of the launch.

[2] Respondents were asked to select from a list of 11 areas of positive impact, selecting all that applied.

Performance Analysis and Lessons Learned

In 2012-13, NRC offered its expertise and facilities to all segments of Canadian manufacturing industry, including SMEs as well as large technology leaders. NRC collected $26.9M in revenues for technical services, $7.5M in research service revenues, and $3.2M in revenues from sales of goods and information services[5] – a strong indication of the relevancy of NRC services to industry clients.

Canada's aerospace industry is driven by the need to replace ageing aircraft, meet regulatory and security requirements, and reduce environmental footprints. In Canada, aerospace manufacturing is second only to automotive, in its contribution to Canada's GDP. While the global market continues to grow, Canada remains within the top five aerospace countries in the world, relying heavily on the aerospace industry for revenue and employment. An example of NRC's support to this industry sector is its collaboration with Pratt & Whitney Canada (PWC). In 2012-13, NRC advanced the state of engine weight reduction technologies through a combination of aero-thermodynamic analysis and experimental testing. These technologies will improve fuel consumption per unit thrust, resulting in better fuel economy for the next generation of aircraft engines.

The Global Aerospace Centre for Icing and Environmental Research (GLACIER) has been advancing icing research and creating high-quality jobs and educational opportunities in northern Manitoba since 2010, and its specialized 9-metre-diameter outdoor test facility is regularly in high demand. In 2012-13, GLACIER qualified (against icing) the most advanced and green PWC engine (The Geared Turbofan) that will be powering the new Bombardier C-Series. Multi-functional coatings with excellent erosion resistance, good corrosion performance, and hydrophobic characteristics were designed, fabricated and tested for helicopter main rotor applications. Dynamic erosion testing of coated propeller

[5] NRC defines "technical services" as services delivered using existing NRC technology and expertise, with low levels of technical risks. "Research services" are non-standard services provided, with incremental intellectual contribution and some level of technical/scientific risk. "Goods and information services" are standard, non-custom goods and information products including those that are web-based.

blades in a wind tunnel confirmed that one of the NRC coatings substantially outperformed the commercially available TiN (titanium nitride) counterpart.

In 2012-13, funding (including $5M from Western Economic Diversification) was secured for a phase two expansion for GLACIER that will turn this seasonal facility into a viable year-round operational facility. New features will include more high speed data channels, emissions measurements systems, extension of rails for endurance testing and additional storage capabilities. The new additions will transform GLACIER into more than an icing research facility: it will enable researchers to conduct testing related to alternative fuels and to evaluate the longevity and durability of engines.

NRC flies the world's first civil jet powered by 100 percent biofuel – On October 29, 2012, NRC achieved a major milestone for the aviation industry by flying the [redacted] first civil jet powered by 100% unblended biofuel. The flight covered approximately 120 nautical miles and reached an altitude of between 28,000-30,000 feet. The biofuel, transformed by Applied Research Associates and Chevron Lummus Global, using oilseed crops commercialized by Agrisoma Bioscience Inc., for use in the engine of the Falcon 20, was found to be cleaner than and as efficient as conventional aviation fuel. Information collected in-flight and analyzed by a team of experts revealed an important reduction in aerosol emissions (50%) when using biofuel compared to conventional fuel. Furthermore, additional tests performed on a static engine showed a significant reduction in particles (up to 25%) and in black carbon emissions (up to 49%) compared to conventional fuel. These tests showed a comparable engine performance and an improvement of 1.5% in fuel consumption during the steady state operations. The jet's engines required no modification since the biofuel tested in-flight meets the specifications of petroleum-based fuels. This aviation initiative was funded by the Government of Canada's Clean Transportation Initiatives and the Green Aviation Research and Development Network and is an example of how government and industry can work together to bridge the gap between Canadian innovation and commercialization and bring effective sustainable energy solutions to market.

The past few years have seen deep and accelerating structural change in the automotive industry, with technological advancement offset by declining consumer confidence and slumps in new car sales. Simultaneously, the market is being driven by fuel consumption challenges and the drive for lighter vehicles, emission reductions, and alternate steering and power train technology. In 2012-13, NRC focused its activities to address these challenges, including productivity – the principle challenge for Canadian SMEs and also larger companies in this manufacturing sector.

The automotive and surface transportation industries have been working to reduce their environmental footprint by increasingly introducing bio-based materials into their products, such as natural fibres made of Canadian flax and hemp and wood sources. To support these objectives, NRC partnered with Magna, the leading Canadian auto parts manufacturer, and implemented the Magna-NRC Composites Centre of Excellence – a unique platform for composite materials manufacturing demonstration and scale-up. NRC and Magna teams together commissioned the direct long fibre thermoplastic moulding and high pressure resin transfer moulding processes at the Centre, validating and demonstrating the application of high performance structural composites for light-weight automotive structures. The studies focused on cycle time reduction while preserving or improving parts performance.

The global construction industry has grown over the past five years, and is still expanding despite increasing material and operation costs, evolving codes and standards, and ongoing global economic difficulties. In 2012-13, natural resources continued to drive Canadian

industry, as well as the need for higher performance of built environments, existence of favourable government policies on retrofitting and urbanization, and the desire for environmentally responsible building materials and processes. The Canadian construction industry is challenged to bring together stakeholders across the value chain to capitalize on new opportunities and look for convergence with other technologies (such as Information and Communications Technologies) to achieve superior performance.

In 2012-13, NRC effectively brought diverse stakeholders together to conceive and develop innovative projects and programs to achieve these results. To address the growing need for energy efficient and environmentally friendly building technologies and tools, NRC delivered showcase demonstrations of NRC-developed energy load-prediction technologies, which enable building owners and operators to more effectively manage energy consumption. NRC also launched three major projects targeting significant energy reductions and improved energy management across the built environment:

- Energy Saving Lighting – This four-year project addresses control systems for LED (light-emitting diode) lighting in commercial and institutional buildings, as well as in remote communities. It will explore the most energy efficient methods to deliver lighting without compromising health, safety, and worker productivity.
- Energy Use and Occupancy Detection – Developed with industry collaborators, this project is delivering new technologies to detect occupancy so that lighting and ventilation can be delivered only where it is needed, and in the quantity required.
- Enhanced Performance of Electrochemical Storage – This project is aimed at improving the efficiency of electrochemical (battery) storage and associated control systems, and the effectiveness of renewable energy from photovoltaic systems. This will ensure renewable energy is available when it is most needed for greatest economic value.

New benchmark for high-performance concrete – In the development of competitive, environmentally responsive construction materials and products, Canadian industry turned to NRC for assistance in the areas of biofoam insulation, structural insulated panels, and the use of biofibres and bioresins in the development of new composite materials. The successful transfer to market of NRC's low-shrinkage concrete (used in the recent construction of the Seaway International Bridge, in Cornwall, Ontario) has set a new benchmark in high-performance, cost-effective civil infrastructure. Completed in July 2012, the Bridge has NRC sensors embedded in the deck which have already confirmed the lack of drying shrinkage for which the concrete was designed. Since its completion, stakeholders in Montreal and the National Capital Region are considering using NRC's concrete technology in upcoming construction and rehabilitation projects.

In 2012-13, NRC delivered the 2012 Energy Efficiency Provisions for Housing and Small Buildings, which will help save Canadians up to $365 million in energy costs by 2020. This builds from NRC's launch of the 2011 National Model Energy Code for Buildings, which effectively placed Canada among global leaders in energy-efficient building construction.

NRC's stage-gate process for program design includes a market study, the identification of partners along the entire value chain, and an analysis of the industry needs. Resources and expertise across NRC are now assembled into teams to develop value proposition and ensure the greatest impact of NRC's investment on the Canadian industry. This has helped to reduce overlap in interactions with clients and between research activities.

More information on Manufacturing Technologies can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Program 1.2: Information and Communications Technologies (ICT) and Emerging Technologies

Program Description: *This program develops and advances technologies to enhance the innovation capacity and growth of Canadian industries in emerging technology sectors and in the Information and Communications Technologies (ICT) sector. This activity is undertaken through multidisciplinary collaborative research and development and through specialized technical and advisory services. Technologies are developed into industrial solutions for the marketplace in the areas of energy, health and ICT, with particular emphasis on the Digital Economy. Activities include assembling and integrating product innovations at the prototype stage and providing access to research expertise and state-of-the art facilities to keep Canadian industry at the leading edge of innovation.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
44.8	44.8	78.0	52.7	7.9

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
300	370	70

Note: Differences in planned and actual spending and FTEs reflect changes announced in Budget 2012.

Program Performance Summary

Expected Result	Performance Indicators	Targets	Actual Results
Advancements in innovative technology solutions in emerging and ICT sectors	Revenue from service contracts and successful Intellectual Property (IP) transferred to emerging industry sectors	$1.5M by March 2013	Revenue collected in 2012-13 in the areas of ICT and Emerging technologies totaled approximately $4.4M from technical services, $3.2M from research services, and $0.2M from IP transferred.[1]
	Percentage of clients reporting positively on the impact of NRC R&D on client growth	85% by March 2013	Due to a new reporting structure, only limited results (3) are available[2]. All respondents reported that services provided by NRC had a positive impact on their organization and resulted in increased sales.[3]

[1] In 2012-13, NRC continued its transition to its new program-based structure; accordingly, the results are an estimate aligned with NRC's current PAA.
[2] NRC launched its new client feedback mechanism in Q4 of 2012-13. As a result, only a small sample of ICT and Emerging Technologies clients (3), in addition to other sector clients, was surveyed as part of the launch.
[3] Respondents were asked to select from a list of 11 areas of positive impact, selecting all that applied.

Performance Analysis and Lessons Learned

The Canadian ICT sector has, on average, been growing by 3.8% annually since 2002, driven by global hyperconnectivity with exponential growth in mobile devices, ubiquitous broadband networks and computing, consumer-driven interaction and experience, social media, and big data. SMEs face many obstacles which include a lack of unified technical standards, a lack of connection among cloud computing, telecom networks, and the proliferation of smart devices. In 2012-13, NRC worked to support the growth of SMEs as they face these challenges.

In 2012-13, NRC's continued advances in the field of advanced photonics led to a breakthrough with the application of coherent anti-stokes raman scattering microscopy for the natural resources sector. Through this work, NRC supported the expansion of the photonics industry into new markets, with the convergence of two important Canadian industries: photonics and natural resources. These innovations are now being applied to quickly image hydrocarbon or mineral deposits in rock, and the biofuel content of algae, as well as to assess the mechanical properties of cellulose-based biomaterials. For example, NRC worked with industry partners, developing technology to image the interactions of oil, solvent, water and sand at the microscopic scale, and then extract oil using small volumes of water (eliminating wet tailings). This supports more efficient processes and greener technologies for oil sands extraction – reducing costs and environmental impacts.

In 2012-13, NRC's Canadian Photonics Fabrication Centre (NRC-CPFC) worked with 25 unique clients (including four new ones) and responded to industry demand by increasing services in areas such as photonics fabrication and the integration and assembly of devices at the prototype stage. To respond to this increased client demand, NRC-CPFC initiated an expansion of capacity through capital investments, increased facility hours, and additional service offerings. This increases five-fold NRC's ability to prototype photonic and electronic devices, thus improving response time to meet industry demands.

RANOVUS Inc., a recently established (2012) Ontario-based corporation with a development centre in Ottawa, is leading global innovation in the development of platform technologies and subsystem solutions for telecom/datacom equipment manufacturers, to support LTE requirements for mobile and data centre connectivity for content distribution to end-users. Through partnership with NRC, RANOVUS benefits from years of innovation in the development and fabrication of quantum dot multi-wavelength (QD MW) laser technology, the unique and innovative light source enabling RANOVUS' various products.

On October 1st, 2012, an industry-driven applied research consortium was officially launched, establishing a five-year collaborative framework between NRC and 13 external partners (ten companies, one Crown corporation, one government department and one industry-sector RTO). The consortium is focused on developing commercialization outcomes in the areas of materials (new conductive and semi-conductive inks), printed devices (printed antennas, logic and photovoltaic) and printed security features. The five-year goal is to produce fully printed Radio Frequency Identification (RFID)-like devices to add distributed intelligence to everyday objects and packaging. It is expected that technologies developed in 2012-13 will lead to commercial products launched by partner companies in the next 12-18 months, specifically in the areas of new screen-printing

conductive ink, ePassports with printed antennas, and automatic time-stamping drug packaging.

Emerging Technology areas such as nanotechnology, quantum technologies and the convergence of nano-, bio-, and information technologies are revolutionizing industries worldwide by providing new platforms that can be applied in a wide range of industries and sustain Canada's competitiveness.

Advanced materials technologies, particularly through the high strength, reduced weight and possibly electrical conductivity of advanced composite materials technologies, underpin a large fraction of Canada's future high-value manufacturing. In 2012-13, drawing on its nano-composite expertise, NRC renewed Canadian licensees of both carbon nanotube synthesis and functionalization know-how. This pioneering work was extended with a breakthrough in the synthesis of closely related boron-nitride nanotubes, which have the additional characteristic of being transparent such that a new technology wave of strong, light, *transparent* materials can be envisioned. NRC worked with all parts of the Canadian nanomaterials and nano-manufacturing value chain to achieve global competitiveness in this space.

Quantum technologies are expected to have impact on future security and communications devices, with applications in security, intelligence, and finance. Building on its strategic collaborations with major players in quantum technology development across Canada and internationally, including Canadian industrial players, NRC is helping shape and facilitate technology deployment in this area for Canadian industry in support of Canada's digital economy. In 2012-13, NRC performed research and development in the next generation of quantum technologies, including demonstrating a prototype quantum photonics random number generator at world-record bandwidths.

Because of its close connection to and strong record of working with the Canadian photonics industry, NRC learned that it was not fully meeting the needs of Canadian firms. Consequently, NRC altered its advanced photonics component activities to draw on the expertise of its recently-created assembly and integration group to address a gap in the availability of expertise in Canada in reliable component packaging. NRC aims to build this competency in order to work with firms and enable them to take advantage of the global printed electronics market. As part of its transition to a Research and Technology Organization, NRC learned the value of ongoing stakeholder consultations, to keep abreast of industry needs.

More information on Information and Communications Technologies (ICT) and Emerging Technologies can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Program 1.3: Industrial Research Assistance

Program Description: *This program supports small and medium-sized enterprise (SME) growth by stimulating innovation capacity and increasing the adoption and/or commercialization of technology-based products, services, or processes in Canada. Assistance is provided to increase opportunities for SME success through: 1) technical and business advice provided to SMEs by a cross-Canada network of field professional staff located in some 100 communities; 2) cost-shared merit-based non-repayable contributions to SMEs engaged in technological innovation of products, services and processes; 3) referrals to partner organizations and key contacts whose resources and international business networks benefit SMEs; and 4) expanding the knowledge-base and capacity of SMEs by increasing access to college and university graduates in SMEs done through NRC-IRAP's participation in the delivery of Human Resources and Skills Development Canada's Youth Employment Strategy (YES).*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
162.6	162.6	259.9	244.6	82.0

Note: Differences in planned and actual spending include changes announced in Budget 2012.

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
340	328	(12)

Program Performance Summary

Expected Result	Performance Indicators	Targets	Actual Results
SMEs in Canada have merit-based access to effective and efficient innovation support resulting in increased wealth	Average return in dollars to the Canadian economy (i.e. wealth creation in terms of increased sales and decreased cost) per dollar of Program cost	$7 by March 2013	$11 return per dollar of Program cost.[1]
	Number of jobs financially supported	2,500 by March 2013	16,583 jobs by March 2013.[2] Of these, in 2012-13, 12,899 jobs were supported through the NRC-IRAP program including 333 jobs supported through YES. In addition, 3,684 jobs were supported through DTAPP.

[1] *Evaluation of the NRC Industrial Research Assistance Program (NRC-IRAP). Final Report*, June 2012. The estimated profit for funded firms for the five-year evaluation period (2007 to 2012) was $440M *per annum*. SME expenditures on wages, salaries and overhead were $1.1B. Average annual NRC-IRAP contributions to firms were approximately $130M.

[2] Performance results include those from both NRC-IRAP and DTAPP. Performance exceeded the two-year target due to a substantial increase in NRC-IRAP funding in 2012-13 (approximately double that of 2011-12) as well as DTAPP funding.

Performance Analysis and Lessons Learned

In 2012-13, NRC supported Canadian SME growth by stimulating innovation capacity and increasing the adoption and/or commercialization of technology-based products, services, or processes, through its Industrial Research Assistance Program (NRC-IRAP). NRC-IRAP is uniquely positioned to provide SME innovation assistance and is complementary to other government programs. The [xvii] *Evaluation of the NRC Industrial Research Assistance Program (NRC-IRAP) Final Report* found that NRC-IRAP program activities and outputs were linked to the achievement of expected client outcomes, and that the majority of NRC-IRAP clients increased their innovation capacity (skills, knowledge, and personnel) through the guidance of Industrial Technology Advisors (ITAs), the financial support provided by NRC-IRAP, or the services provided by the funded organizations. Forty-seven percent of NRC-IRAP funded clients reported that in the absence of project funding, their technologically innovative projects would not have proceeded at all, pointing to the program's positive impact on client success.

In 2012-13, NRC played a key role in several partnership programs in support of SMEs. It expanded the knowledge-base and capacity of SMEs by providing $5.1M to increase their access to college and university graduates as part of the Human Resources and Skills Development Canada's Youth Employment Strategy (YES). NRC also partnered with Public Works and Government Services Canada (PWGSC) in the process improvement and assessment of SME proposals to the Canadian Innovation Commercialization Program (CICP), which is designed to help SMEs bridge the pre-commercialization gap. For CICP Round Three 2012-13 activities, over 100 NRC ITAs were directly engaged in the assessment of 257 bids. Of the 20 bids pre-qualified by PWGSC, nine are NRC-IRAP clients. In 2012-13, NRC-IRAP designed and delivered training to ITAs who review proposals for this program.NRC also delivered year two of the Canadian HIV Technology Development Program (CHTD) with $1.2M in spending, and received approval to reprofile $1.7M from 2011-12 to 2013-14. As of March 31, 2013, 14 IRAP-CHTD Contribution Agreements were signed.

Optimizing advertising on the Internet – Acquisio (Brossard, QC) is a leading world expert in monitoring, assessing and optimizing advertising campaigns on interactive networks. In 2006, the agency Développement économique Longueuil, put Acquiso into contact with NRC-IRAP. The company needed input from mathematicians and experts in operational research to solve complex problems associated with the performance of *key words*, a critical area for developing the solutions they needed to market. NRC-IRAP ITAs understood Acquisio's vision and put the company's founders in touch with experts from the Department of Mathematics and Industrial Engineering at the École Polytechnique, and with the computer science and operational research department (DIRO) at the University of Montreal. Starting in 2007, a number of projects undertaken with the assistance of NRC-IRAP made it possible for Acquisio to increase the performance of its solutions much more quickly than anticipated. Acquisio now provides high-performing software solutions to marketing and media placement specialists, as well as to advertising agencies, in order to help them determine the impact of their campaigns on search engines and social networks, and to maximize returns on advertising for their clients. With access to world-class expertise and financial support through NRC-IRAP, Acquisio was able to expand its research and development to a competitive level, enabling them to penetrate a highly specialized niche market. In addition, since working with NRC-IRAP, Acquisio has grown from three to 115 employees in five years, and has systematically doubled its revenues each year from 2007 to 2011.

The Digital Technology Adoption Pilot Program (DTAPP) is a significant investment into the Canadian economy which aims to increase the productivity growth of SMEs in Canada through the adoption of digital technologies. This is done by actively partnering with colleges and other organizations to provide SMEs with services and support. Contributions payable to SMEs were capped at $99,999 per project, and the average contribution ($70,058) constituted 28% of the total cost of a technology adoption project. In other words, funding was leveraged by private sector partners, as SMEs invested $2.60 for every dollar of DTAPP funding for digital technology adoption projects. In 2012-13, $24.2M was committed to organizations: $21.1M (87.5%) to firms, $2.1M (8.5%) to colleges, and $1M (4%) to other organizations such as universities and industry or regional economic development associations. A total of 25 DTAPP projects were undertaken with colleges and a further 23 projects with other organizations.

When NRC-IRAP established DTAPP as a pilot program, it planned to collect, analyze and report on the Program's impacts, benefits to participants, productivity improvements achieved by firms, and capacity-building achieved by colleges and other organizations. To capture this information, new tools and processes were developed, and improvements were also made to processes and systems on an on-going basis – all resulting in significant streamlining of the data collection process and enhancement of data quality. DTAPP reports program progress on a monthly and quarterly basis.

Smarter, faster, and much more flexible – Ross Video Ltd. provides customers around the world with various innovative products for use in broadcast, distribution, live event and production applications. In 2012, the company realized it needed to update its Customer Relationship Management (CRM) software as it wasn't working well across time zones and had limitations that led to significant delays in the firm's ability to support customers and win projects. Gregory Fruchet, an Industrial Technology Advisor (ITA) with NRC-IRAP helped Ross Video to implement a new CRM system through funding provided by DTAPP. "Ross Video's new CRM software enables the firm to keep track of its sales pipeline more efficiently and enhances the firm's productivity in several measurable ways," said Fruchet. As a result of the DTAPP project, Ross Video re-engineered each process within its sales chain, decreased the duration of its weekly sales conferences by 50%, improved its regional sales managers' effectiveness, and increased its effectiveness in processing and fulfilling orders across the globe.

NRC recognized that while collection of data was critical to management of its support efforts to SMEs, reporting on activities related to funding, as well as providing feedback, proved to be a difficult administrative burden for most clients. To respond to these issues, NRC streamlined procedures and clarified information delivered to clients. Clients are also now able to provide feedback about NRC-IRAP directly through its website.[6]

More information on Industrial Research Assistance can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

[6] Details regarding the success of the ongoing management efforts will be available in the upcoming NRC evaluation report on DTAPP.

Program 1.4: Health and Life Science Technologies

Program Description: *In support of the Health and Related Life Sciences and Technologies priority of the federal S&T Strategy, this program develops and advances technologies and techniques that can enhance the innovation capacity and growth of Canadian industries in the health and life sciences sector. This is done through multi-disciplinary collaborative research and development services in addition to specialized technical and advisory services for transferring or advancing technologies into industrial solutions for the marketplace. This includes the development and testing of product and process innovations as well as the provision of coordinated access to multidisciplinary research expertise and state-of-the art facilities to ensure that industries in Canada are at the leading edge of innovation.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
107.5	107.5	134.6	82.5	(25.0)

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
751	624	(127)

Note: Differences in planned and actual spending and FTEs reflect changes announced in Budget 2012, including the centralization of overhead resources into Internal Services, which was consolidated in 2012-13.

Program Performance Summary

Expected Result	Performance Indicators	Targets	Actual Results
Canadian health and life science industries have greater access to effective and innovative technology solutions	Revenue from successful IP transferred to Health & Life Science industries	$2M by March 2013	$5.3M in 2012-13[1]
	Percentage of respondents from the health and life science industrial collaborators who respond positively on value of NRC innovative contributions	85% by March 2013	94% of respondents (16 of 17) reported that the services provided by NRC had a positive impact on their organization.[2]

[1] Results are aligned with NRC's current PAA. Future reporting aligned with a new program structure is on target for the 2013-14 reporting cycle.

[2] NRC launched its new client feedback mechanism in Q4 of 2012-13. As a result, only a small sample of Health and Life Science Technology clients (17), in addition to other sector clients, was surveyed as part of the launch.

Performance Analysis and Lessons Learned

Although the Canadian life sciences sector has faced significant challenges as a result of the global economic slowdown, it continues to show determination and resiliency. Other leading nations are moving aggressively to position their life sciences industries at the forefront of the next generation of economic growth. It is imperative that Canada bridge the innovation gap in life sciences (moving concepts to commercialization) to maintain its global position.

In 2012-13, NRC collected $11.4M through research services to clients as well as $3.5M in technical services, through co-development or candidate evaluation agreements with Canada's vaccine industry, as well as through the provision of S&T solutions to Canadian and international partners. To foster the growth of Canadian SMEs by gaining access to global markets, NRC took advantage of its strategic international partnership initiative with China and Taiwan and organized two industry match-making workshops in China. These introduced Canadian SMEs to Chinese companies in the vaccine sector, opening the door for partnership negotiations involving four Canadian SMEs, one of which is now at an advanced stage of development.

Biologics (new biological medicinal products that are synthesized from living organisms or their products, and used as diagnostic, preventive or therapeutic agents) reduce the incidence of adverse reactions, increase the efficacy of treatments, and ultimately improve health outcomes and reduce hospitalization costs for Canadians. In 2012-13, NRC signed 80 collaborative and R&D service agreements (including amendments), and 40 licence agreements with industrial partners related to biologics. Accessing NRC's unique biotechnology expertise allowed SMEs to focus on their core business without having to develop a broad range of laboratory capabilities in-house.

Drug discovery partnership leads to lucrative agreement – Access to NRC expertise and facilities enabled Zymeworks, a Vancouver-based biotech with no wet lab capabilities, to land a [xviii] lucrative agreement with Merck worth up to US$187M. [xix] NRC was instrumental in testing the company's virtual approach by producing, purifying and screening its antibodies designed through computer simulations. Zymeworks now employs more than 40 people in high quality jobs, having added 11 jobs since 2011 in part due to its work with NRC.

Hospital acquired infections (HAIs) are a big challenge internationally. In September 2012, [xx] NRC and Taiwan renewed their Memorandum of Understanding, by which NRC will build on its 15-year strategic partnership with Taiwan's National Science Council (NSC) and its Industrial Technology Research Institute (ITRI). Under this partnership, researchers will plan and develop vaccines against HAIs within three years and start the trial stage on new drugs in the fifth year of the program.

NRC continued to improve technologies for identifying and measuring pathogens, such as *E. coli*, to help strengthen food and water safety in Canada. Working in collaboration with Health Canada, NRC improved its prototype operation which can now identify primary Verotoxic *E-coli* in less than 30 minutes, using a 200% reduction in sample volumes and processing reagents. This leads to a cheaper test that can be performed more rapidly and, very importantly, will allow automation, eliminate the need for manual processing, and eventually increase portability of detection devices. These technology improvements have piqued industry's interest and NRC is now in discussion with a Canadian-based firm about the potential adaption of NRC's S-Prep technology for clinical and environmental applications. An Atlantic Canadian SME is also interested in its potential application to rapidly diagnose viruses such as HCV and HIV, as well as detect nucleic acids.

In September 2012, NRC signed an 11-year Canadian Wheat Flagship Strategic Alliance agreement with Agriculture and AgriFood Canada, the University of Saskatchewan, and the province of Saskatchewan. Collectively contributing approximately $100M to the first five years of the initiative, the parties have committed to working together to improve wheat yield for the benefit of Canadian farmers and the Canadian economy. By combining their complementary areas of expertise in wheat breeding, genomics, biotechnology, and pathology, Alliance members hope to accelerate the breeding of new and improved wheat varieties, which will result in reduced losses due to drought, heat, cold stress, and disease, additionally reducing nitrogen fertilizer requirements. Six initial large-scale research projects have already been launched, and both a Steering and Management Committee have been put in place to ensure the right strategic focus and the coordination of efforts. Emphasis is being placed on engagement of the private sector with a goal of generating at least a 25% private sector contribution to Alliance activities by 2016-17.

The Genomics R&D Initiative (GRDI) coordinates federal science departments and agencies in the field of genomics research. NRC is the lead department, providing secretariat services for the initiative, and actively contributing to the research. In 2012-13, NRC scientists partnered with private companies to develop targeted therapy for cancers based on NRC's antibody library and expertise in antibody-drugs characterization. NRC also contributed to the two large-scale shared priority projects of the GRDI: 1) the Quarantine and Invasive Species project, which aims at protecting Canada from species that have the potential to cause millions in economic losses; and 2) the Food and Water Safety project, which aims at reducing risks to Canadians from food and waterborne pathogens. A panel of independent experts provided a positive mid-term review of both projects in March 2013.

Bringing together the required critical mass to undertake large scale efforts can require complicated collaborative and alliance agreements involving multiple parties with distinctly different organizational cultures, including, among other things, different approaches to technology transfer and publication. NRC learned it is imperative to have clear, open, and frequent communication so that key issues can be resolved to the satisfaction of all parties before the agreements are drafted. NRC will use this knowledge and experience to enable it to be more efficient and effective when establishing future agreements, and will use several different means (committees, working groups, and terms of references) to build the trust necessary to make such large-scale multi-party collaborations work.

More information on Health and Life Science Technologies can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Program 1.5: Energy and Environmental Technologies

Program Description: *In support of the Natural Resources and Energy priority and the Environmental Science and Technologies priority of the federal S&T Strategy, this program develops and advances technologies and techniques for enhancing the innovation capacity and growth of Canadian industries in the natural resources sector and to address Canadian environmental issues. This is done through multi-disciplinary collaborative research and development services in addition to specialized technical and advisory services for transferring or*

advancing technologies into industrial solutions for the marketplace. This includes the development and testing of product and process innovations as well as the provision of coordinated access to multidisciplinary research expertise and state-of-the art facilities to ensure that industries in Canada are at the leading edge of innovation.

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
27.9	27.9	43.7	27.5	(0.4)

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
298	267	(31)

Note: Difference in planned and actual FTEs reflects changes announced in Budget 2012, including the centralization of overhead resources into Internal Services, which was consolidated in 2012-13.

Program Performance Summary

Expected Result	Performance Indicator	Target	Actual Results
Collaborative contributions on improving sustainability of Canada's natural resources and protection of Canada's environment through innovation	Percentage of responding collaborators who respond positively on the value of NRC contributions to natural resource sustainability and environmental protection innovations	85% by March 2014	100% of respondents (9 of 9) reported that the services provided by NRC had a positive impact on their organization.[1] When asked in which areas NRC assisted their firms, all respondents indicated that NRC's services helped accelerate technology development, getting it to market faster, and 56% of respondents (5 of 9) indicated that NRC's services increased their knowledge and ability to plan and execute R&D projects.[2]

[1] NRC launched its new client feedback mechanism in Q4 of 2012-13. As a result, only a small sample of Energy and Environmental Technologies clients (9), in addition to other sector clients, was surveyed as part of the launch.

[3] Respondents were asked to select from a list of 11 areas of positive impact, selecting all that applied.

Performance Analysis and Lessons Learned

Innovation in the area of environmental technology is driven by factors such as the need to ensure that economic growth and environmental sustainability can co-exist, and the ever-increasing costs associated with pollution control and conformance to regulations. For Canadian industry, activities are focused into three areas: environmental protection, environmental sustainability, and resource management. Although the Canadian industry in renewable energy is growing, fluctuating prices for natural gas have dampened innovative projects, and so support is needed to help advance key technologies, reduce costs, and improve performance and reliability of these energy options.

NRC performed very well in 2012-13 in the areas of energy and environmental technologies, with receipt of $2.0M revenue from its research services and $7.0M revenue

from its technical services. NRC additionally provided services to industry in the area of ocean, coastal and river engineering – intrinsically tied to sustainable management of Canada's natural resources.

In 2012-13, NRC worked with technology developers and users to improve the sustainability of Canada's energy and mineral resources, with the overall objectives of lowering the cost, energy intensity and environmental impact of resource development, while reducing greenhouse gas emissions for overall energy supply and use. This was accomplished by NRC's contributions in areas including:

- real-time analysis techniques of ore concentrations for optimizing mineral extraction;
- reduction of maintenance costs and improved life extension of equipment used by oil sands and hard rock mining companies and equipment suppliers;
- improved *in situ* bio-based land remediation techniques;
- greater energy efficiency of oil sands processing and upgrading technologies;
- battery and Fuel Cell/Hydrogen technologies for enhanced electric vehicle performance; and
- biomass conversion technologies.

For Canadian industrial collaborators to succeed, it is critical to identify the roadblocks along the value chain, from biomass producers to final manufactured goods users. Through its Industrial Biomaterials initiative, NRC engaged the key stakeholders of the Canadian industrial biomaterials sector, deploying a strategy aimed at addressing these critical gaps with leading industrial collaborators in the automotive and construction sectors. In automotive, NRC implemented, as briefly mentioned above, the Magna-NRC Composites Centre of Excellence – a unique platform for composite material manufacturing demonstration and scale-up. With industrial collaborators such as Lignol Innovations, NRC has begun addressing the challenges upstream in the value chain, to support the successful implementation of the biorefinery business model.

To contribute to Canada's Northern Strategy, NRC began development of an Arctic program focused on three critical areas of impact: resource development, northern transportation, and community infrastructure. NRC has focused on:

- *Healthy housing; technologies for improved building systems to reduce the cost of operation* – NRC participated in the development of Aboriginal Affairs and Northern Development Canada's Blueprint on the Canadian High Arctic Research Station (CHARS). NRC has identified the need for improvements in the areas of ventilation and health, LED lighting and health, and for planning of housing and Arctic infrastructure demonstrations.
- *Safe and cost-effective transportation; Technologies for Navigation Decision Tools to reduce the risk and cost of shipping* – NRC's pressured ice model was used by the Canadian Coast Guard, which helped test it and has been increasingly using it in a fully operational capacity. NRC's ice management tools also provided industry and regulators with support for decision-making regarding planned fleet deployment for offshore development and transportation needs. By these efforts, environmental risks and barriers to the development of arctic resources are being reduced, and the

navigational tools may be further developed for use by all shipping and transportation companies.

- *Environmentally-sensitive development of natural resources; Technologies for the means to reduce the environmental risk of oil spills from offshore production systems* – NRC developed the Beaufort Sea Engineering Database (BSED) with key industry and government clients, and with their direct input. The BSED supports the design of ships and structures that will need to operate year-round in the Arctic, to support resource development. It has already become a primary point of reference for regional environmental information for industry partners, and ensures that engineering decisions are made with the best available regional information.

Positioning Canada as world leader in carbon capture and recycling – Through its Algal Carbon Conversion initiative, NRC signed an agreement in December 2012 for approximately $19M with Canadian Natural Resources Limited (Canadian Natural), one of the largest independent crude oil and natural gas producers in Canada, and Pond Biofuels Inc., a rapidly growing Canadian company. Through this undertaking, the Algal Carbon Conversion Pilot Project will use algae to recycle industrial emissions by using carbon dioxide to grow algal biomass and processing it into products such as biofuels, biomaterials, and soil amendment products. Planning is underway for the construction of a pilot demonstration algal biorefinery at Canadian Natural's site. The ultimate goal is to test the techno-economic viability and scalability of such a facility, so that if proven successful it can then be used as a model for recycling industrial emissions across industries in Canada and the world.

While working to implement a common program/project management process based on Project Management Institute (PMI) global standards and deliver project outputs, NRC found that the inconsistent project management approach and varying levels of knowledge and experience previously developed in NRC's institutes, was a barrier to success. NRC took several steps to improve its project management performance:

- NRC built a professional project support team to lead transitional changes. This team played a vital role in developing PM standard processes and tools that are researcher-oriented and provide project managers with on-the-job training, particularly through project planning and development process.
- NRC implemented a project governance structure to clarify project management roles and responsibilities, while also standardizing the project development and approval process. Standard templates and costing/pricing tools were developed to ensure projects aligned with NRC's financial, business and project management requirements.
- NRC standardized the project planning, implementation, and execution processes. The SAP project support module was adopted across NRC for managing and monitoring projects, and common templates were adopted by all project managers.
- NRC implemented effective communication and training activities, effectively improving staff engagement.

More information on Energy and Environmental Technologies can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Strategic Outcome 2

Strategic Outcome 2: Canadians have access to research and development information and infrastructure		
Performance Indicator	**Target**	**2012-13 Performance**
Proportion of surveyed S&T infrastructure users who report positively on the value of the NRC infrastructure used	85% by March 2013	95% of users of STM information services indicated they were satisfied or very satisfied with services received. In addition, fewer than 4% of metrology clients polled reported any negative issues related to services received. Concerning its infrastructure services, NRC's success in attracting users speaks positively to the perceived value of NRC contributions.

Through NRC, Canadian firms and researchers accessed national facilities and information infrastructure to help them conduct research and take new products and technology innovations to market. In 2012-13, NRC provided access to science infrastructure to Canadian research communities, including the TRIUMF sub-atomic research facility, a suite of neutron-scattering spectrometers at Chalk River Laboratories, and, as mandated by the *National Research Council Act*, state-of-the-art international astronomical observatories, while also collecting and distributing astronomical data through the Canadian Astronomy Data Centre.

NRC's national science library collection was heavily used by Canadians in 2012-13. NRC provided access to the national science library collection via an agreement with a private document delivery service, Infotrieve. Over 24,000 documents were supplied to Canadians last year, with an additional 50,000 supplied internationally. In addition, Infotrieve consolidated its global document delivery operations in Canada at the NRC Ottawa location. NRC usage of the e-journal collection continues to be heavy, with almost 450,000 articles downloaded in 2012-13. The volume of requests made against the collection indicates the value that clients found with this service.

During 2012-13, NRC restructured its operations as part of its transition to a program-based, industry-oriented research and technology organization. NRC performance results are provided at the Program level, as the organization continues organizational changes announced in Budget 2012. NRC remains committed to effective and transparent reporting principles. Future reporting aligned with a new program structure is on target for the 2013-14 Departmental Performance Report cycle.

Program 2.1: National Science and Technology Infrastructure

Program Description: *This program manages national science facilities and infrastructure critical to research, development and innovation by Canadian scientific and technological communities. Facilities include the TRIUMF sub-atomic research facility and a suite of neutron-scattering spectrometers at Chalk River Laboratories. They also include astronomical observatories and the laboratory for national measurement standards as mandated by the National Research Council Act.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
98.9	98.9	105.6	94.9	(4.0)

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
282	260	(22)

Note: Differences in planned and actual spending and FTEs include the centralization of overhead resources into Internal Services, which was consolidated in 2012-13.

Program Performance Summary

Expected Results	Performance Indicators	Targets	Actual Results
Canada's national science and technology facilities are up-to-date and accessible to Canadians in accordance with federally legislated and assigned mandate and/or evolving national needs	Percentage of surveyed clients reporting positively on their perceived value of NRC R&D infrastructure used	85% by March 2013	During this year of transformation, NRC did not undertake a separate client feedback exercise. In 2011-12 an evaluation of its international telescope agreement program (covering the 2005-11 period) found that the majority of principle investigators questioned as part of this evaluation (those awarded time on Gemini, JCMT, and/or CFHT) agreed or strongly agreed that NRC staff effectively facilitated their access, or the access of their research team, to the international telescopes. This, combined with the continued high subscription rate for these international telescopes, speaks positively to NRC's success in bringing value to its clients.
	Number of Canadian users of major NRC science infrastructure	1,200 by March 2013[1]	NRC's science infrastructure user communities have increased over the last three years. Since 2010, NRC welcomed 2,187 users, surpassing its target of total users. In 2012-13, NRC welcomed 893 users (an increase of 36% from the previous year).

[1] Cumulative number of users over three years.

Performance Analysis and Lessons Learned

In April 2012, NRC assisted in organizing the Canadian Square Kilometre Array (SKA) Pre-construction Networking Workshop, which brought together participants from nine government organizations, four universities and over 40 Canadian firms, to explore opportunities to work together. This activity led to the creation of the Canadian SKA industry consortium, to coordinate Canada's industrial efforts. Representatives from Australia, South Africa, Italy and the UK also attended. NRC also participated in the ongoing development of astronomical facilities, including elaboration of concepts for a next-generation Canada-France-Hawaii Telescope (ngCFHT), for which an international workshop was held in March 2013.

The Thirty Metre Telescope (TMT) is nearing the end of the preconstruction phase, moving into its next stage of development. Canadian researchers and industry have contributed to the design phase of the TMT. This project is expected to contribute to astrophysics research while providing opportunities for spillover technologies that will be used in industry. In 2012-13, the TMT parties have defined the TMT International Observatory Master Agreement which outlines the roles of the various players in TMT construction, the governance structure and the operating principles. The TMT will take ten years to build.

Inauguration of ALMA – On March 13th 2013, the Atacama Large Millimeter/submillimeter Array (ALMA), the largest ground-based astronomical project in the world, was inaugurated, celebrating ALMA's transition from a construction project to a fully-fledged observatory. The inauguration ceremony took place at ALMA's Operations Support Facility (OSF), 34 km from San Pedro de Atacama, in Chile. Located at the highest and driest desert in the world, ALMA is one of astronomy's most powerful telescopes, providing unprecedented imaging capabilities and sensitivity many orders of magnitude greater than anything of its kind today. The Observatory is comprised of an array of 66 radio antennas that work together as one telescope to study millimetre- and submillimetre-wavelength light from space. These wavelengths cross the critical boundary between infrared and microwave radiation and hold the key to understanding processes such as the formation of planets, stars, galaxies, and of organic and other molecules in space. NRC has been a key player in ALMA since 2002, developing and maintaining ALMA's Band 3 (3mm or 100GHz) receiver. Manufactured by Canadian industry, this cutting-edge technology operates at 4 Kelvin, calibrating and maintaining the integrity of the detectors in each antenna. NRC researchers are now also playing a significant role in the development of the proposed Band 1 receiver.

Canada's international telescopes (CFHT, Gemini, and JCMT) are all heavily subscribed[7], demonstrating demand by Canadian astronomers for telescope access. A high subscription rate (the ratio of time requested to the amount of time available on a given telescope) is viewed by the astronomy community as a reliable indicator of the relevance and demand of observatories and their instrumentation.

Helping industry comply to regulatory standards – NRC anticipated the needs of industries to demonstrate compliance with regulatory standards for black carbon emissions. The solution was to develop an innovative mobile system that provides quantitative measurements of the concentration of black carbon nanoparticles. The patented and licensed NRC technology has been named in an Aerospace Information Report presently out for consideration. The report recommends inclusion of the mobile system as part of a new certification requirement which would be a component of a new International Civil Aviation Organization (ICAO) global standard and recommended practice to address air pollution and greenhouse gas emissions (black carbon) from the aviation sector.

NRC's Canadian Neutron Beam Centre (NRC-CNBC) provided neutron beam access to users seeking to attain new understandings of materials, improve products, and strengthen their businesses. One highlighted success involved an AUTO21 research team aiming to improve casting technologies for light-weight alloys for vehicle engines. Stress measurements were taken, to evaluate the effectiveness of stress relief performed on a prototype engine block. The knowledge gained led to a second phase of the project (set for 2013-15) which will optimize performance of light-weight alloys. The team involves

[7] NRC's telescope subscription target is 1.5. Based on applications received in 2012-13, subscription rates averaged: CFHT – 1.51, Gemini N – 2.58, Gemini S – 1.91, JCMT – 3.19. As per its astronomy contribution agreements, Canada has a pre-determined share of observing time. Access to Canada's share is merit-based and determined through a peer review process.

researchers from General Motors, Nemak Inc., three universities, and the CANMET Materials Laboratory.

Functioning as Canada's national laboratory for research in subatomic physics and operated as a joint venture by a consortium of 11 Canadian full-member universities and six associate-member universities, TRIUMF receives its federal funding via a Contribution Agreement from NRC, which plays an important oversight and stewardship role for TRIUMF on behalf of the Government of Canada. Over 150 Canadian scientists and students contributed to the significant scientific accomplishments driven by TRIUMF: the discovery and confirmation of the Higgs boson at CERN's Large Hadron Collider and ATLAS experiment; validation of an approach to measure the detailed properties of anti-hydrogen atoms; confirmation of the role of three-body nuclear forces in exotic nuclei; and new understanding of the phenomenon of superconductivity in layered materials. TRIUMF also led a team of Canadian researchers to the successful demonstration of technetium-99m isotope production on existing medical cyclotrons in British Columbia and Ontario, a feat heretofore only possible on nuclear reactors employing weapons-grade uranium. Meanwhile the ARIEL project construction proceeded with near-final completion of conventional facilities and services and substantial advancement of technical equipment including first tests with electron beams from the new electron-gun facility.

As mandated in the *National Research Council Act*, NRC provides accurate, traceable measurements that define the national standard in line with international requirements. To support this mandate and create impact in a timely manner, NRC engaged in an endeavour involving acquisition of a Watt balance apparatus from the National Physical Laboratory (NPL) of the United Kingdom (which measures the Planck constant, a fundamental constant of nature from which the international metrology community has agreed that the kilogram should be derived), renovating a disused and derelict laboratory, and collaborating with NPL to re-assemble a variety of components and subsystems, all custom built. The first measurement result, independently confirming the UK result prior to disassembly, was a major success. Further modifications led to an even greater increase in precision in a short amount of time (five months). As a result of this project, NRC not only expanded its capability in laboratory design and assembly, but also positioned itself to make a timely and major contribution to international measurement standards.

To address the challenge of developing and providing metrology to ensure repeatability of measurements on nanomaterials, NRC expanded initial work on nanomaterial reference materials and metrological atomic force microscopy. This work includes development of measurement protocols for purity assessment of nanocarbon materials (including carbon nanotubes and grapheme) that are needed to support the introduction of new reference materials for industry and for applications in printable electronics.

More information on National Science and Technology Infrastructure can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Program 2.2: Scientific, Technical and Medical Information

Program Description: *As mandated by the National Research Council Act, this program operates and maintains the national science library, specifically holding the national collection of Scientific, Technical and Medical (STM) information, and offers information services. The program provides Canada's research and innovation communities with access to global STM information, to facilitate knowledge discovery, cross discipline research, innovation and commercialization.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
18.7	18.7	19.8	16.5	(2.2)

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
93	115	22

Note: Differences in planned and actual FTEs are due to consolidation of Records Management under this program.

Program Performance Summary

Expected Result	Performance Indicator	Target	Actual Result
High value information that advances research and innovation in the areas of science, technology and health/medicine	Percentage of clients who reported that NRC Canada Institute for Scientific and Technical Information (NRC-CISTI) information services contributed to advancing their research and development, technology commercialization or planning and decision-making.	85% by March 2014	95% of clients indicated they were satisfied or very satisfied with services received[1]

[1] Results of two surveys on the Competitive Market Intelligence service, involving 200 NRC management and research staff. No survey for the Strategic and Technical Insights service was carried out in 2012-13, although surveying will resume in 2013-14.

Performance Analysis and Lessons Learned

In April 2012, NRC introduced the Competitive and Market Intelligence (CMI) services, providing close to 1000 extensive information searches and analyses to NRC management during the year – some very wide in scope. For example, 18 industry sectors were analyzed by a cross-disciplinary team of NRC experts, and the resulting current state "snapshots" were used in a strategy development session to identify potential areas for NRC alignment with industry needs. Client satisfaction with the CMI suite of services was high in 2012-13, with feedback indicating that the information provided was considered crucial for preparing research program business cases and plans, setting goals for programs, narrowing down program focus, and helping managers make informed decisions on specific projects. Two key areas were flagged for service improvement in the coming year: the need for increased

analysis and summation of primary and secondary information to highlight business opportunities, and the need for additional information to identify the key players critical to competitiveness in a given field and target market. Work is currently underway at NRC to address these opportunities for improvement.

The NRC Foresight service was launched in November 2012, starting with the development of a vision for the service and an outline of the key drivers and guiding principles for foresight studies, and the definition of service parameters. A detailed plan for the first full year of the Foresight service was prepared and will be carried out in 2013-14. An initial foresight exercise was performed in late 2012, including an analysis of approximately 400 foresight studies from other international research and technology organizations (RTOs), supplemented by interviews with 19 thought leaders and senior executives from industry, government, NGOs and academia. A "subsequent scenarios" exercise based on the themes identified during the analysis was then held with NRC executives, who were asked to consider the implications of these trends, and of disruptive technologies, for NRC's future in supporting Canadian industries. The results of the exercise were used in considering the overall corporate strategy and direction. They were also useful in decision-making for Programs in development.

Both CMI and Foresight services relied on collaboration with, and input from other NRC business units. Creating strong linkages with these other groups was a key success factor in the development of the services over the year.

In 2012-13, the number of other government departments and agencies using NRC shared library services continued to grow. There are now 14 agreements with nine departments or agencies for one or more library technical services. NRC staff also participated in several Government of Canada initiatives on the provision of library services across government. NRC's activities in this area demonstrated that shared library services can result in efficiencies with no loss of service to clients.

Canadian research data registration service launched – In May 2012, NRC formally launched the [xxv] DataCite Canada Digital Object Identifier (DOI) registration service and signed up ten Canadian data centres over the following months. These organizations, along with NRC, are now able to register data sets and related documents and publications by assigning DOIs to them. This allows data producers to share and get credit for their data, makes research data easier to access, reuse and verify, and helps to ensure that the data generated by Canadian researchers can be leveraged for additional social and economic benefit. This service is provided free to Canadian not-for-profit organizations. Approximately 2000 items were registered this year, and the volume is expected to grow substantially in coming years.

NRC discovered that organizational flexibility and training programs were essential in implementing CMI and Foresight services, both developed in response to changes at NRC. To meet these challenges, NRC launched an action plan for expertise development, which included a mix of formal training, group events and the use of Communities of Practice where expertise and best practices could be shared. This allowed staff delivering the new services to develop new skills and capacity required to deliver them effectively.

More information on Scientific, Technical and Medical Information can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

Internal Services

Description: *Internal Services are groups of related activities and resources that are administered to support the needs of programs and other corporate obligations of an organization. These groups are: Management and Oversight Services; Communications Services; Legal Services; Human Resources Management Services; Financial Management Services; Information Management Services; Information Technology Services; Real Property Services; Materiel Services; Acquisition Services; and Travel and Other Administrative Services. Internal Services include only those activities and resources that apply across an organization and not to those provided specifically to a program.*

2012-13 Financial Resources ($ millions)

Total Budgetary Expenditures (Main Estimates) 2012-13	Planned Spending 2012-13	Total Authorities (available for use) 2012-13	Actual Spending (authorities used) 2012-13	Difference 2012-13
119.4	119.4	147.8	186.9	67.5

2012-13 Human Resources (FTEs)

Planned 2012-13	Actual 2012-13	Difference 2012-13
637	879	242

Note: Differences in planned and actual spending and FTEs reflect changes announced in Budget 2012, including the centralization of overhead resources into Internal Services, which was consolidated in 2012-13.

Performance Analysis and Lessons Learned

Effective April 1st, 2012, NRC consolidated all of its internal services into corporate groups. This initial effort provided the reference point for the launch of many Internal Services improvement projects to support NRC's mission-oriented research and development activities in a cost-effective manner. The most significant initiatives are described in this report and include ongoing collaboration with other Government of Canada common services organization such as Shared Services Canada.

Governance and Management Support

Program Management: As part of its support to R&D programs, NRC integrated its programs and projects business process in 2012-13 to permit real-time reporting. This included the full implementation of the Project System module of NRC's enterprise-wide business system (SAP) along with related learning activities (Financial Management and Project Management training). NRC also completed documentation of its research program development lifecycle, including guidelines and decision-making criteria, made available to staff via a newly-created internal SharePoint application. In addition, NRC established the initial framework for mid-term program performance reviews to ensure a rigorous approach to review R&D activities and to support post-program decisions on renewal, re-direction or closure.

Integrated Planning and Reporting: NRC continued to integrate its planning and reporting activities to align with strategic and operating goals. In 2012-13, a new planning and reporting cycle was implemented to align the organization's corporate strategic and operational priorities with program plans and multi-year resource requirements. The planning and reporting cycle also supports ongoing business reviews, performance measurement including staff performance plans, and decision-making.

Communications: To advance NRC's transition, a number of initiatives were implemented to support customer and client engagement. Although research program activities were still being defined in 2012-13, NRC targeted select industry tradeshows aligned with its strategic priorities to showcase its capabilities, including Construct Canada, World Hydrogen Energy Conference 2012, Photonics West, and the Farnborough Air Show. Other accomplishments included re-vamping NRC's corporate website to enhance the user's experience and consolidate facilities and services content towards client and industry needs. In parallel, the use of social media vehicles increased through the corporate Twitter accounts (combined 2,500 followers and 400 tweets), and the introduction of a LinkedIn account with over 5,000 followers since its introduction in December 2012. With its expansion into new media to further secure coverage of NRC news and events, NRC has increased media requests from 50 in 2010 to more than 350 in 2012.

International relations: In June 2012, Canada officially became an associate member country of EUREKA, the largest industrial R&D network of its kind in the world. To meet its objective to "grow Canadian industrial competitiveness and address national issues faster and/or at lower cost through international actions," NRC took on the role of Canada's National Office for EUREKA, with NRC-IRAP providing funding for EUREKA projects to eligible SMEs. In fulfillment of its role:

- NRC launched its first call for proposals – the Canada-Israel Technology Innovation Partnership – with the Office of the Chief Scientist in Israel, inviting expressions of interest from Canadian SMEs in water research, alternative energy and brain research.
- Following the January 2013 EUREKA Multilateral *Call for Proposals in any technology field*, NRC handled 13 requests for information from Canadian partners, resulting in seven proposals submitted.

Proposals for both calls are currently being evaluated. NRC also convened a Canadian National Committee (CNC) for EUREKA to help identify strategic market and sector priorities for Canadian SME participation in EUREKA projects. The CNC comprises high level representatives from NRC, the Canadian Manufacturers and Exporters Association (CME), Innoventures Canada (I-CAN), Industry Canada, and Foreign Affairs and International Trade Canada.

Integrated Client Focus and Management: In 2012-13, NRC extensively beta-tested its Client Relationship Management System (CRMS) which moved to the implementation phase in April 2013. Information on 1,720 NRC clients was entered into the system, which allowed for the testing of information retrieval, sales forecast and data mining. Information obtained from the CRMS will serve to identify cross-organizational opportunities and

consolidate management of external clients. NRC business development staff now use the system to manage existing client relationships and develop new business opportunities.

Resource Management Services

Financial management services: To support its programs' re-focusing efforts, NRC began implementation of new financial management reporting model following a business-like structure and processes. The underlying financial system improvements will facilitate a more integrated planning, budgeting and reporting cycle. Delivery of a training curriculum to both finance and non-finance staff, now underway, will improve financial competencies in areas of planning, budgeting and forecasting, reporting, and costing. It will also allow for faster implementation of relevant policies and integration of leading-edge best practices. Non-financial managers will also receive basic financial management training and coaching through workshops and ongoing business reviews.

In 2012-13, upgrades to the financial system (SAP Business Intelligence reporting module) will make possible timely monthly reporting of NRC's financial results and key performance indicators. SAP systems improvements will also support reporting of accrual-based internal statement of operations at a consolidated level and also by organizational units, programs and projects. These business-like financial statements will help managers conduct timely reviews to support decision-making and transparency.

As NRC continued its re-focusing activities in 2012-13, it improved a number of business processes that needed adjustment in order to support a more efficient and effective organization. A more robust financial management system of planning, budgeting/forecasting, and reporting was identified as a key element of success for NRC to become a mission-oriented research and development organization. To address these concerns, in 2012-13, significant changes were made to NRC's financial structure, management processes, reporting and systems. This will allow NRC to better analyze and compare financial data across organizational units in a similar and consistent manner. Work is also underway towards the implementation of an overall integrated and sustainable planning cycle and strengthening of financial management and control practices.

NRC's 2012-13 Operational Plan identified three critical capacity gaps which needed to be addressed to support NRC's new operating model: the need for essential targeted training in areas of financial management, project management, and client services. Training approaches for financial and project management commenced in 2012-13 and will continue in 2013-14. Training in the client services area was developed aligned with changes made to NRC's business management approach for delivery beginning in fiscal year 2013-14.

Information management services: NRC began a major review of its records and document management capabilities and undertook a number of initiatives to move towards implementing an NRC-wide Electronic Working Environment (NEWE). The proposed environment will enable NRC to manage all its information assets electronically, with robust collaboration and information sharing capabilities.

The new NRC Information Management Policy, published in April 2012, outlines the roles and responsibilities of the organization and individuals in managing corporate information. NRC also launched a survey of all of its business information resources (including research data) in order to determine how the electronic working environment will manage multi-purpose information. NRC also started a pilot project to test the feasibility of an eRecords management system. Over the next three years, the NEWE initiative will be implemented to provide a full electronic working environment.

Human Resources: In 2012-13, NRC began implementation of its new organizational structure, which was re-oriented to align with NRC's business model changes. NRC's HR Branch supported the transitional activities by defining and classifying new and modified functions to support the new organizational direction, supporting implementation of a new management structure to ensure effective leadership to achieve NRC's goals and mandate.

2012-13 marked year two of the implementation of NRC's new performance management program "Commitment to Excellence" (CTE). The implementation of a continual feedback loop has helped identify weaknesses and facilitate the evolution and continual improvement of the CTE program. To help NRC managers and employees define more meaningful and effective performance expectations, a suite of tools were deployed and targeted meetings and information sessions were held. Early evidence suggests improved quality of performance commitments for 2013-14.

Polls can give employees the opportunity to share their ideas and provide managers with a "snapshot" of employee views. In 2012-13, NRC launched a weekly e-poll to take a pulse on employee engagement during the organization's transition as well as on other topical workplace issues. The results influenced NRC management decisions on workplace interventions and other pressing issues. NRC launched extensive communication efforts to clarify NRC's change management activities, using vehicles such as the internal *Reach* newsletter and "town hall" meetings across NRC.

Asset Management Services

IT Services: NRC completed a number of projects relating to its IT infrastructure and employee security. These projects produced considerable improvements in NRC delivery of IT services in part by standardizing and reducing the complexity of the technical environment. Other benefits realized include better collaboration throughout the organization and reduced costs.

- GC Web Accessibility Standards – NRC's external-facing websites were upgraded to meet NRC's corporate obligations and improve accessibility for all Canadians;
- Enterprise Collaboration Service (SharePoint) – NRC's SharePoint service was extended to a growing number of employees providing greater collaboration and functionality;
- IT Service Management – NRC implemented a common tracking system to address IT issues and services requests more efficiently. The system is sufficiently flexible and robust that it is now being considered to manage clients' requests in other Internal Services areas.

The ongoing operations in support of (former) NRC IT infrastructure continued relatively smoothly during the migration of IT services to Shared Services Canada. Work continues on processes governing SSC activities and funding for new NRC programs and projects. NRC maintains a strong relationship with SSC, which will enable greater cooperation between the two organizations.

Security Services: As part of NRC's Departmental Security Plan, approved by the Senior Executive Committee in June 2012, a project was launched to conduct a comprehensive risk assessment of all NRC facilities. This project is progressing as planned and is expected to be completed in 2013-14. Results to date have allowed NRC to identify and address several operational issues, thereby improving NRC's overall security postition.

More information on Internal Services can be found on [xvi] the supplementary information page for NRC's DPR 2012-13.

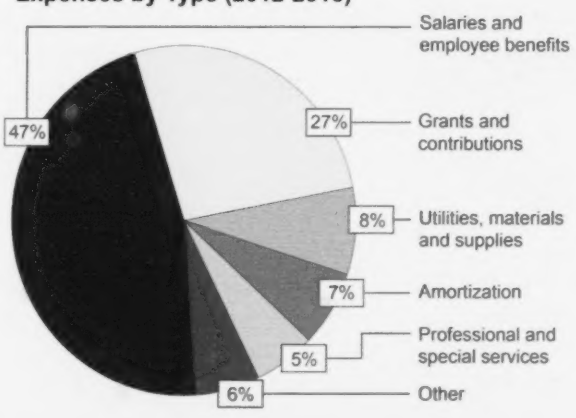
Section III: Supplementary Information

Financial Statements Highlights

Condensed Statement of Operations and Departmental Net Financial Position

National Research Council Condensed Consolidated Statement of Operations and Departmental Net Financial Position (Audited) For the Year Ended March 31, 2013 ($ thousands)					
	2012-13 Planned Results	**2012-13 Actual**	**2011-12 Actual**	**$ Change (2012-13 Planned vs. Actual)**	**$ Change (2012-13 Actual vs. 2011-12 Actual)**
Total expenses	806,582	915,025	847,643	(108,443)	67,382
Total revenues	180,656	155,272	170,913	25,384	(15,641)
Net cost of operations before government funding and transfers	625,926	759,753	676,730	(133,827)	83,023
Departmental net financial position	**537,885**	**565,750**	**525,205**	**(27,865)**	**40,545**

Expenses by Type (2012-2013)

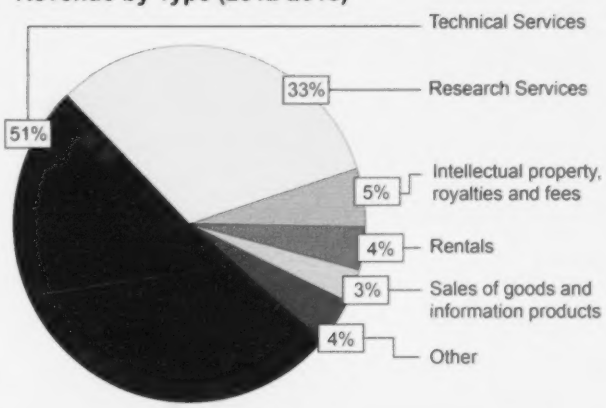


NRC incurred total expenses of $915M in 2012-13, an increase from the $847.6M spent in 2011-12. NRC's major expense components are salaries and employee benefits ($428.6M) and grants and contribution ($247.7M), representing 73.9% of total expenses. The $67.4M increase is primarily due to an increase in grants and contribution expenses ($104.1M) and a decrease of salaries and employee benefits ($26.9M). The increase in grants and contributions expense is the result of an additional $110M per year in funding to double NRC's Industrial Research Assistance Program (NRC-IRAP) as announced in Canada's Economic Action Plan 2012. The decrease of salaries and employee benefits is primarily attributed to fewer full-time equivalent employees (FTEs) compared to 2011-12, offset in part by higher workforce adjustment payments in 2011-12. Most other expenses categories appearing in the financial statements decreased from 2011-12 due to cost containment management. The planned expenses, as reported in NRC's Future Oriented Financial Statements in the *2012-13 Report on Plans and Priorities (RPP)*, were $806.6M. The variance between planned and actual results is primarily due to the actual grants and

contributions expenses that were $78.2M greater than the planned amount, and the actual salaries and employee benefits that were $27.5M higher than the forecast.

NRC generates revenue that can be reinvested in operations. NRC earned total revenues of $155.3M in 2012-13, a decrease from $170.9 in 2011-12. NRC's major revenue components are Research Services ($50.4M) and Technical Services ($79.5M), representing 83.7% of revenues. The planned revenue, as reported in NRC's Future Oriented Financial Statements in the 2012-13 RPP was $180.7M. The variance between planned and actual amounts is due to NRC refocusing its research activities and business processes during 2012-13 which limited increasing NRC's public outreach to Canadian industry on technology-based services.

Revenue by Type (2012-2013)

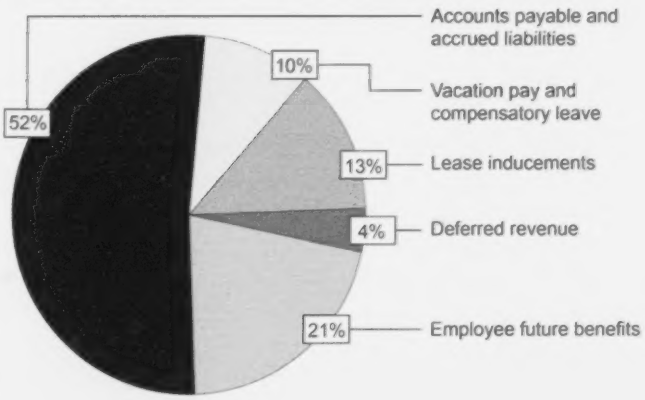


Condensed Statement of Financial Position

National Research Council Condensed Consolidated Statement of Financial Position (Audited) As at March 31, 2013 ($ thousands)			
	2012-13	**2011-12**	**$ Change**
Total net liabilities	321,019	267,096	53,923
Total net financial assets	326,872	216,326	110,546
Departmental net (surplus) debt	(5,853)	50,770	(56,623)
Total non-financial assets	559,897	575,975	(16,078)
Departmental net financial position	**565,750**	**525,205**	**40,545**

NRC's consolidated net liabilities consist of accounts payable and accrued liabilities, vacation and compensatory leave, lease inducement, deferred revenue, lease obligation for tangible capital assets and employee future benefits. The balance as at March 31, 2013 of $321.0M represents a $53.9M increase from the March 31, 2012 balance of $267.1M. The increase is primarily due to higher accounts payable for contributions

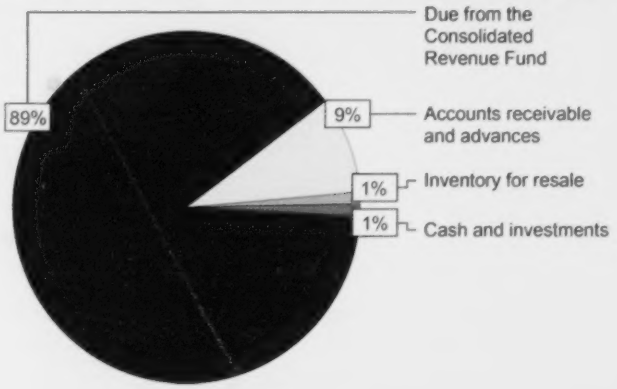
Consolidated Net Liabilities as at March 31, 2013



related to the NRC Industrial Research Assistance Program (NRC-IRAP) at year-end, the result of additional funding received by NRC-IRAP in 2012-13 as announced in Canada's Economic Action Plan 2012. NRC's consolidated net financial assets totalled $326.9M as at March 31, 2013, an increase of $110.6M from the March 31, 2012 balance of $216.3M. The balance is made up of Due from the Consolidated Revenue Fund (CRF), accounts receivable and advances, inventory for resale, and investments. The increase in NRC's consolidated net financial assets is mainly due to the increase of the Due from the CRF which increased by $106.9M. An increased balance of revenues available for use in future years ($46M) and an increase in accounts payable and wages payable ($61M) were the primary sources of the increase.

The overall increase in consolidated net financial assets contributed to NRC having a departmental net surplus position as at March 31, 2013, a measure of the organization's ability to repay all debts. NRC's strong financial position is also reflected in its Departmental Net Financial Position at March 31, 2013, which was improved by $40M over the previous year to $565.8M.

Consolidated Net Financial Assets as at March 31, 2013



Financial Statements

NRC's complete financial statements are published on [xvi] the supplementary information page for NRC's DPR 2012-13.

Supplementary Information Tables

- Details on Transfer Payment Programs (TPP)
- Greening Government Operations (GGO)
- Horizontal Initiatives
- Internal Audits and Evaluations
- Response to Parliamentary Committees and External Audits
- Sources of Respendable and Non-Respendable Revenue
- User Fees and Regulatory Charges/External Fees

All electronic supplementary information tables listed in the *2012-13 Departmental Performance Report* can be found on the [xvi] National Research Council website.

Tax Expenditures and Evaluations Report

The tax system can be used to achieve public policy objectives through the application of special measures such as low tax rates, exemptions, deductions, deferrals and credits. The Department of Finance publishes cost estimates and projections for these measures annually in the [xxii] *Tax Expenditures and Evaluations* publication. The tax measures presented in the Tax Expenditures and Evaluations publication are the sole responsibility of the Minister of Finance.

Section IV: Other Items of Interest

Organizational Contact Information

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Endnotes

i. Justice Laws Website, http://laws.justice.gc.ca/eng/N-15/index.html
ii. Industry Canada, http://www.ic.gc.ca/cic/site/icgc.nsf/eng/00871.html
iii. Treasury Board Secretariat, http://www.tbs-sct.gc.ca/ppg-cpr/frame-cadre-eng.aspx
iv. Science, Technology and Innovation Council, http://www.stic-csti.ca/cic/site/stic-csti.nsf/eng/h_00058.html
v. Treasury Board Secretariat, http://www.tbs-sct.gc.ca/pm-gp/doc/ompca-ecogp/ompca-ecogp-eng.asp
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xii. Canadian Environmental Assessment Agency, http://www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1
xiii. EUREKA, http://www.eurekanetwork.org/
xiv. National Research Council, http://www.nrc-cnrc.gc.ca/eng/reports/2010_2011/dpr_0.html
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xxii. Finance Canada, http://www.fin.gc.ca/purl/taxexp-eng.asp